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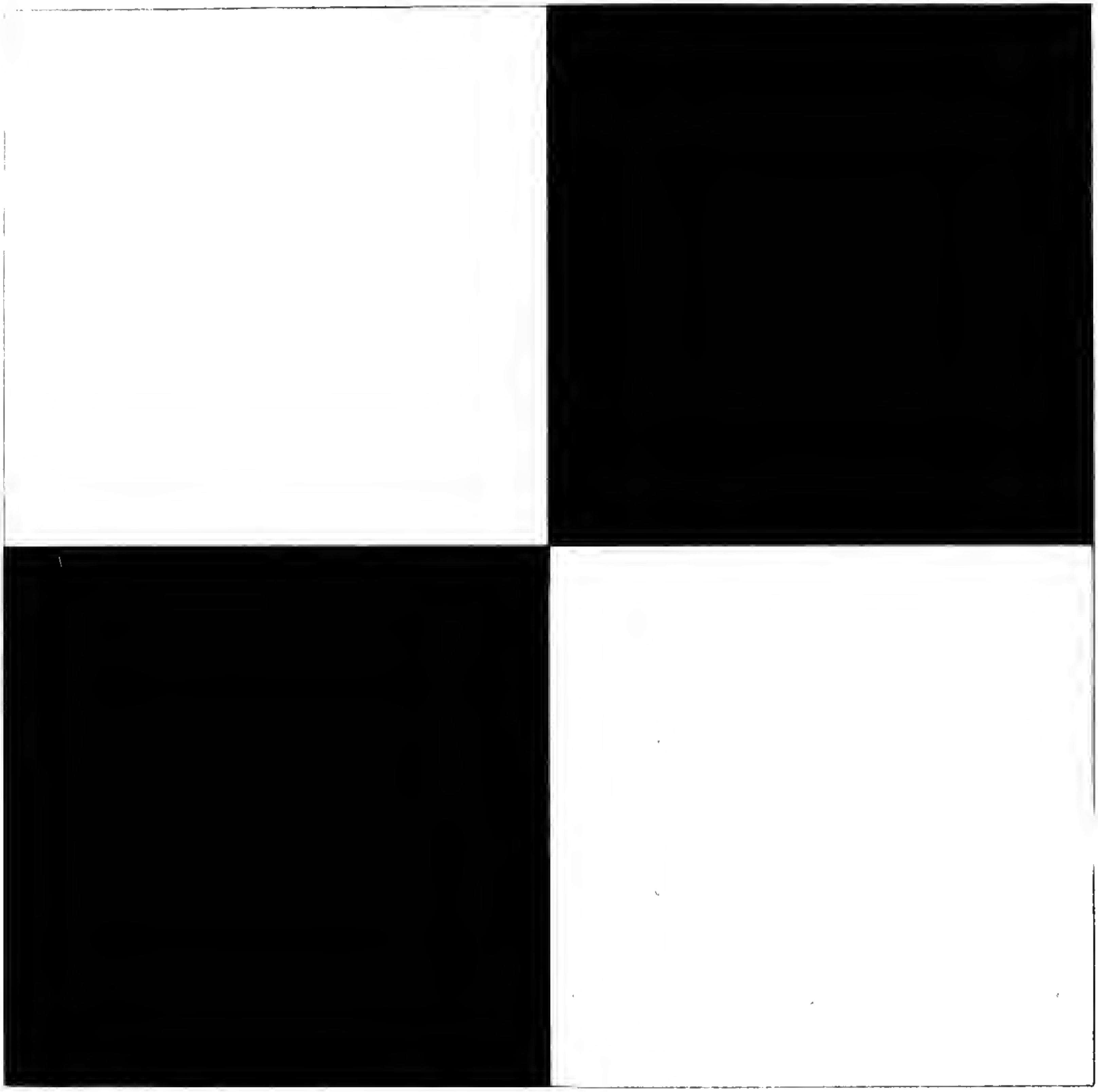

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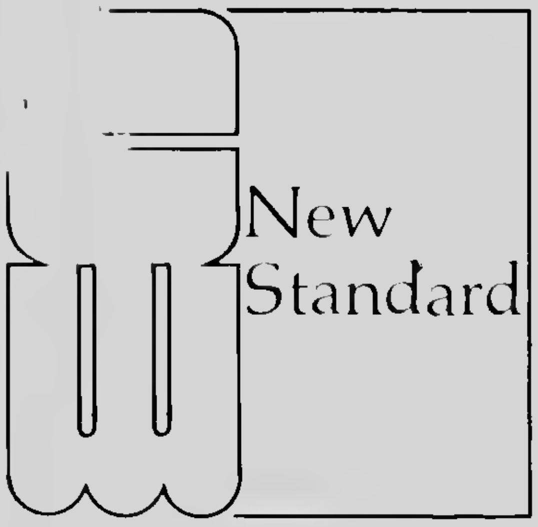

Ansi Doctors, OKs Mumps

By Don Leavitt
CW Staff

NEW YORK — About a year after supporters of the Mumps language published a proposed standard for public comment [CW, Sept. 13, 1976], the document — slightly revised — has been accepted by the American National Standards Institute (Ansi).

Ansi gave its stamp of approval earlier this month and copies of the standard should be available later this year, although no decision has been made as to who will publish it, according to a spokeswoman for the organization.

Thus Mumps (originally the Massachusetts General Hospital Utility Multiprogramming System) joins a very select group of languages. Only Fortran, Cobol and PL/I have gained Ansi's sanction prior to this. A proposed standard for minimal Basic is still under consideration.

Despite its medicine-related beginning, Mumps has been applied to a growing range of applications of a more general nature. It has also been adapted to a growing number of hardware hosts — some 18 or 20 at last count — typically in the minicomputer and small business system range.

Mumps' path to standardized status was very different from the one taken

(Continued on Page 2)

Push Toward Pact Slowed

U.S. 'Wins' at Data Flow Parley

By Nancy French
CW Staff

VIENNA, Austria — A platoon of nearly 50 Americans arrived here late last month to fight a battle in what one person characterized as an "economic war." And they won.

The battleground was a graceful ballroom lit by glittering chandeliers in the Redoutensaal Conference Center here, where earphone-clad troops speaking in half a dozen languages salvoed terms like "nontariff trade barriers," "data havens," "data cartels" and "increased telecommunications tariffs."

The battle itself was a meeting called "The Data Bank Panel" of the Organization for Economic Cooperation and Development (OECD) held to discuss the impact that privacy laws already enacted by 13 industrial nations could have on the flow of data across international borders.

In the end, even the summary in which Dr. F. Vaselsky, secretary of state of the Federal Chancellery of Austria, was to have called for an international agreement among OECD nations was softened because of American pressure.

In addition to a small interagency diplomatic team coordinated by the U.S. Department of State, the American contingent represented the entire spectrum of vested interests in the European data processing and communications community — from attorneys and management consultants to time-sharing and DP services companies and from bureaucrats to college professors supported by research dollars.

The individuals, whose travel expenses were paid largely by American companies and industry organizations rather than by U.S. taxpayers, arrived agreeing on only one principle: Any international accord calling for any restriction of data transmission across national boundaries, whether for reasons of protecting individual privacy or otherwise, was either unnecessary or at least premature.

Naomi Seligman, a principal in a management consulting firm known as McCaffery, Seligman and von Simpson, Inc., set the tone early by warning against the dangers of moving ahead with any sort of international

(Continued on Page 4)

Commission Gives Nod To Treasury EFT, Bars Bell

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The National Commission on Electronic Funds Transfer (EFT) recently affirmed the U.S. Treasury Department's development of an EFT system through the Federal Reserve and effectively barred AT&T from competing in EFT services.

Meeting to adopt its final recommendations, the EFT commission opposed the Privacy Protection Study Commission by supporting the Treasury Department's efforts to speed Social Security and other federal retirement and aid payments to beneficiaries through the Federal Reserve's EFT system.

In addition, the commission concluded that AT&T cannot compete against other EFT suppliers unless a 1956 consent decree or Federal Communication Commission (FCC) rules which prohibit Ma Bell from offering services other than tariffed communications services, are modified.

The EFT commission disagreed with the privacy commission recommendation that no governmental entity be allowed to own, operate or otherwise

(Continued on Page 2)

IBM Shuffles Price Lists

ARMONK, N.Y. — IBM Corp. has shuffled its price lists, reducing the purchase price of many key entry products, hiking certain peripheral lease costs and flip-flopping maintenance charges in both directions.

Most key entry products received price reductions in the 25% range, according to a spokesman. For example, the Model 024 card punch, which cost $1,630, will now sell for $1,225; the IBM 129 card data recorder, formerly $4,865, now costs $3,650, and the 5496 data recorder, which once cost $5,535, is now priced at $4,150.

Lease and rental charge increases of up to 10% were made on some printers and a limited number of other products, the spokesman said, citing two examples.

The monthly rental of the 1403 N1 printer is up to $1,081 from the previous $983; the same unit on a two-year lease now costs $908/mo., up from $826.

The Model 3211 printer now has a monthly rental cost of $2,000, up from the previous $1,905. On a two-year lease, the price is now $1,680 compared with the previous $1,600.

Increases of up to 8% were also made

(Continued on Page 6)

Few Users Planning Switch To SNA

IBM's Systems Network Architecture (SNA) has attracted much interest but few staunch supporters among 370/168 and 370/158 users, a *Computerworld* survey of 20 large-scale systems users has found.

In interviews with corporate DP managers and people in comparable positions, the survey found 17 companies, or 85% of the users contacted, had considered upgrading to SNA. Only two of the respondents admitted they had not evaluated SNA and one user, fearing disclosure of possibly proprietary information, refused to say whether it had investigated the product.

Yet despite their admitted curiosity about SNA, only 20% of the respondents said they had definitely committed themselves to the IBM offering, while 25% had rejected it outright and 40% expressed uncertainty about their installation plans. The remaining 15% of the users refused to say whether they intend to upgrade to SNA.

This is the final article in a three-part report on users' attitudes toward alternative CPUs, distributed processing and IBM's Systems Network Architecture by Jeffry Beeler, Ronald A. Frank and Molly Upton.

Users that have already installed SNA or plan to do so soon differed widely in the benefits they said they expect to gain from the equipment change. Some of the users predicted the product will cut their communications line costs and error rates.

Others expect to increase the variety of peripherals they can place on line to their computers. And still others forecast that SNA will allow their terminals to perform multiple functions.

Companies that had evaluated but later rejected SNA cited doubts about the product's promised benefits as the reason for their decision. In some instances, the skeptical users admitted that their misgivings about SNA stemmed from a wariness of new products in general.

Undecided users reported for the most part that they would withhold judgments about SNA's applicability until they had finished evaluating the

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Commission Upholds Treasury EFT

(Continued from Page 1)

manage any part of an electronic payments mechanism that involves transactions among private parties."

Federal Reserve EFT operations can be made to meet privacy objectives by adhering to confidentiality rules and procedures at least as strict as those followed by private sector EFT system operators, the commission said.

Furthermore, access by other federal agencies to records of automated clearing house (ACH) transactions, on which the Federal Reserve EFT system is based, should also be limited by rules at least as restrictive as those for access to ACH records by private-sector financial institutions, the commission added.

While disagreeing with the privacy commission on this point, the NCEFT called "reasonable and appropriate" two other privacy recommendations. One would limit the retention of individually identifiable account information generated by EFT services. The other would establish procedures enabling individuals to promptly correct inaccuracies in EFT transaction or account records.

With regard to AT&T, the EFT commission did not take a position on whether the 1956 Consent Decree should be modified.

Based on the assumption that EFT services are data processing and not regulated communications, the commission did recommend that regulated carriers be allowed to provide EFT services, though not under tariff.

Echoing comments received by the FCC from users and members of the computer industry in connection with the Second Computer Inquiry [CW, June 13], the commission urged that if carriers do enter this DP market on a nontariffed basis, they should not be permitted to cross subsidize their EFT services with profits from monopolized, tariffed services.

Focusing specifically on AT&T in its recommendations, the EFT Commission noted that Ma Bell, "as the largest supplier of the regulated communication services industry, poses special problems.

AT&T, on the one hand, may possess technological knowledge, research capabilities and be able to offer systems and services in EFT markets that should be available to the public," the commission said.

AT&T, on the other hand, may possess dominant market power which could be exercised in the unregulated EFT markets in a manner which would force other firms from those markets and preclude the entry of new firms into those markets," the commission added, concluding that in the long run, this would be detrimental to the public.

Limits of AT&T

The 1956 consent decree essentially limits AT&T to operations which can be marketed under a common carrier tariff. In addition, the FCC 1971 decision at the end of its First Computer Inquiry forbids a common carrier such as AT&T from marketing DP services unless it sets up a separate subsidiary to conduct this business.

AT&T has not created such a subsidiary, and there is some question whether the Consent Decree would permit it to do so.

The net effect of taking no position on the modification of the Consent Decree and of reminding AT&T of the restrictions resulting from the First Computer Inquiry is to express the EFT commission's belief that the telephone company currently has no place in the EFT services market, a commission spokesman said.

Other recommendations voted by the commission include:

- EFT terminals be deregulated as much as possible.
- The FCC registration program for direct interconnection be applied to EFT terminals using the public switched network.
- Federal and state communications regulation be applied only to "the underlying communications transmission and distribution (transparent) facilities used with EFT systems."

The group will hold one last meeting on Oct. 13-14 before presenting its work to Congress and the President.

Ansi Sanctions Mumps

(Continued from Page 1)

by the other languages, though it too was an established method.

The other languages have gone through Ansi's X3 technical committees which typically had infrequent meetings of voluntary participants producing results only after long stretches of time, according to a spokesman for the Mumps Development Committee (MDC).

Instead of that, a number of Mumps users got together several years ago, recognized that standardization was the best way to protect the language as its implementation grew, and formed the MDC.

With good support from the National Bureau of Standards (NBS), a long-time Mumps user, the language became the first in which standard development work was fully funded.

MDC and NBS saw a need to clarify the language in three separate but related areas: a narrative description, a formal definition including charts to document syntax and semantics, and portability requirements. The three parts of the standard were brought together and published in January 1976 as *NBS Handbook 118*.

In May of that year, MDC approached Ansi to determine the best route through standardization. Ansi okayed the distribution of the handbook for comment and, at the same time, for acceptance or rejection by a specially selected "jury" of some 200 people across the country.

The comment period ended late last year and Ansi considered the results of that process along with the jury's votes for or against the proposed standard.

Copies of *NBS Handbook 118* can be ordered, as document C13.1:118, for $2.70 each from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

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U.S. 'Wins' at Vienna Meet

(Continued from Page 1)

data accord without sufficient "empirical research.

Seligman pointed out that the omnibus approach to privacy regulation originally proposed in the U.S. "presumes there are abuses in areas where there may be none and, through application of heavy-handed remedies, creates new burdens which did not previously exist.

Even where there are abuses, such an approach often fails to focus on underlying causes. Thus, she said, "the solutions offered tend to be both inappropriate and unnecessarily disruptive to the social and economic fabric," particularly in the "rapidly changing technological environment engendered by computer and communications."

Philip Onstad, speaking for the association of Data Processing Service Organizations (Adapso), likened the processing and networking services provided by Adapso's member companies to the safety deposit box provided by a bank.

The data is placed there by the customer, who should also bear the responsibility of assuring its accuracy, timeliness and fairness. The service organizations should be expected to provide no more than a secure environment for the customer's data, he said.

Harmonizing Laws

Many attendees, including representatives from Sweden, France, Austria and Gemany, argued in favor of an international accord to harmonize the myriad of existing national privacy laws. Some even cited precedents for such action.

Paul Sieghart, a member of the UK's Data Proctection Committee (something like the U.S. Privacy Commission, argued in favor of extending mutually acceptable rules to all "relevant countries" to eliminate worries about information processing done outside a nation's borders. Rather than restricting data flow, this "will enhance data flow," he explained.

No Terms Defined

Although the delegates struggled to present their interpretations of the hodgepodge of issues raised. The conferees seemed a long way from even defining their terms.

John Richardson, director of the U.S. Commerce Department's Office of Telecommunications, summed up the American view on the final day of the conference when he observed that the problems under discussion were not well defined. To move ahead with "corrective machinery" under these circumstances would be "risking some unnecessary or counterproductive restrictions," he said.

The Commerce Department official contended it should be the goal of the assembled nations to avoid data flow barriers without harming individuals' privacy rights.

However, he warned, protecting the property rights of legal persons — i.e., corporations — is also a factor not to be overlooked. Barriers such as exclusive regulations and tariffs will deny these rights, he claimed.

Britons in Agreement

The American view was buttressed by those of several British conferees who argued against moving ahead with an international agreement before evidence could be found to justify it.

Sir Norman Linghop, director of Hatfield Polytechnic and chairman of the UK's Data Protection Committee, compared transborder data flow to international trade, "which has been going on for thousand of years and we're still trying to regulate it."

Charles Reed, director of the interbank Research Organization in the UK, argued that the conferees — even the OECD organizers — failed to distinguish between technical developments and the uses to which they are put.

One could not assume that banks — or governments, for that matter — would use technical equipment "for evil" simply because the equipment had that potential, he said.

Vaselsky, in the summary statement in which he had been expected to come down strongly in favor of a full-blown international convention on data protection, conceded that the conference was aimed at identifying points of view rather than making decisions.

The issue of privacy "is one of human rights," he said. The individual shouldn't be at the mercy of those who control information, but "a bridge doesn't build itself; market forces on their own won't solve the problem."

It's up to the democratic, industrialized nations "to build the bridge and reach a consensus," he said.

Onerous Restrictions

By Nancy French
CW Staff

VIENNA, Austria — A number of countries may place restrictions in the near future on the recording and foreign location of certain types of personal files as well as the transmission of certain data across national boundaries.

According to the organization for Economic Cooperation and Development (OECD), possible restrictions that could have some onerous implications for a multinational corporation or a firm in the data services industry include the following:

- Data banks shall not include information on a person's race, opinions, political activities, trade union membership, medical condition, alcoholism, criminal offences, confinement for mental disorders, discharge from the armed forces or forfeiture of civil rights.
- Credit bureaus for citizens of a country may not be operated outside its territory.
- Special requirements would be placed on the use of personal data in advertising, direct mail, credit bureaus, insurance organizations, etc., for internal processing and transmission abroad.
- No organization domiciled in one country shall use data processing facilities abroad unless all provisions applying to domestic processing are observed in the other country concerned.
- If data is to be processed abroad, it may be transmitted only when it can be assumed that disclosure will not entail undue encroachment of privacy.
- Data banks shall not transmit personal information abroad unless special authority has been given.
- Exporting collections of personal records will be forbidden except under license.
- The organization in charge of a data base shall keep a copy of all data transmitted to a foreign country.

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Police System Proves Transfers Can Be Made

By Don Leavitt
CW Staff

READING, Pa. — "From Pueblo to Reading to Allentown" sounds like a baseball double-play combination, but it really outlines the route followed by a police information system that was built from the ground up with transfer in mind.

Since the system has already been transferred once, there seems to be no major problem standing in the way of moving it to other police forces, according to Rod Steffy, the Reading detective who manages the system here.

At the moment, the local police department has the system up and running on its Univac 90/30 and is getting ready to transfer it to Allentown, and perhaps other cities, in northeastern Pennsylvania. But the story started in Pueblo, Colo.

Project manager William Langendoerfer, a civilian with the Pueblo police, worked closely with Univac in 1975 to develop a definition of need and to gain a grant from the Law Enforcement Assistance Administration (LEAA).

The system Pueblo envisioned was to provide on-line access to a master name index and a "wants and warrants" file, as well as being the backbone of a dispatching operation. It was to be written in Cobol wherever possible, using top-down structured programming techniques.

Two programs supporting a phonetic name search were written in BAL for efficiency, but otherwise Cobol prevailed. Designed around Univac's IMS/90 OS/3 environment, it was developed by four people in just about a year, Langendoerfer recalled.

The development team included two local people and two from Univac. The Univac portion of the effort amounted to more than $250,000 in manpower costs and that, in Langendoerfer's opinion, was "very unusual" support for a system intended for such modest hardware as the 90/30.

Since the software was to be given away to any other police force that needed it, Univac probably saw a potential for selling a number of CPUs if the system worked well, he acknowledged.

In February, 11 months after Pueblo installed its system, the same hardware/software combination was delivered to Steffy and the police force here. Because of the planning that preceded the Colorado implementation, Langendoerfer had nothing to do to make the software ready for Reading.

Steffy and his colleagues have made some modifications and he expects more as the system is adapted to local needs, but he said only "minimal effort" on the part of a recipient is needed to make the system work.

As was the case in Colorado, Steffy also welcomed support he's received from his chief of police and the mayor of the city. Without that kind of backing, no system will be really effective, Steffy and Langendoerfer agreed.

The only real problem Reading had as the system was implemented was acclimating the police officers themselves to work with the on-line facilities. Now, however, they have accepted it and the terminals, especially in the detective division, are being well used, Steffy noted.

System Extension

Reading has been extending the system received from Pueblo to include, among other things, a gun registration subsystem, an offenses and incidents file, traffic violations and support for crime prevention. But Steffy said they haven't really been able to absorb all these enhancements.

A "real desire to transfer the system" on the part of the recipient is pobably the biggest prerequisite to success, Russ said. In discussing the situation further, however, he suggested good rapport between donor and recipient is equally important.

He noted, for example, that both he and Steffy — and various others he contacted in other police departments — are ex-Marines.

Langendoerfer laughed when he heard about the "Marine connection," explaining that as an ex-Navy man he was used to supporting the leathernecks, but he hadn't thought it would carry over to his civilian work.

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10/25	Cherry Hill, NJ	11/16	Indianapolis
10/26	Pittsburgh	11/16	Chicago
10/26	Denver	11/16	Tulsa
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· SEE PAGE 3.

Survey Finds Few SNA Converts Among Users

(Continued from Page 1)

product and had had an opportunity to review their findings.

Elsewhere in the survey, CW found that all the users contacted had installed some form of computerized data communications network but that the characteristics of those networks varied widely.

Twenty percent of the respondents reported they had built their networks around remote job entry (RJE) terminals. Ten percent of the users said they had installed an interactive network, and 50% described their nets as a mixture of RJE and interactive capabilities.

The remaining 20% declined to give details about their data communications setups.

Asked to explain why his company rejected SNA, William Caldwell, operations manager for Amoco Production Co., said officials at the Tulsa, Okla., firm doubted the product could live up to IBM's performance claims.

Northwestern Mutual Life Insurance Co. used a similar argument to justify its rejection of SNA, according to Jeff Dunn, the Milwaukee firm's assistant DP director. Dunn said his company considered upgrading to SNA at one time but added that he has learned from experience to be wary of new products, IBM's or otherwise.

The Aluminum Co. of America (Alcoa), on the other hand, decided against upgrading to SNA primarily because the Pittsburgh-based firm does not mix data processing applications on its terminals, technical services manager R.N. Wehling said. For this reason, the company concluded it would benefit little from upgrading to the IBM product.

Alcoa officials also decided they could use a cluster of CRT terminals to effectively duplicate an SNA-based system, Wehling added.

D.L. Campbell, director of PPG Industries, Inc.'s computer center in Pittsburgh, offered a different reason for his company's opposition to SNA. "Frankly, I don't like it," he complained. "I think it's too restrictive in IBM's favor. It represents an attempt to create an all-IBM environment in the computer room, and in this day and age I don't think IBM can pull that off."

Those in Favor

Other 370/168 and 370/158 users, however, voiced opinions just as strongly in favor of SNA. The Joseph Schlitz Brewing Co., for example, expects the IBM product to yield lower communications costs, lower error rates and improved line discipline, according to R.L. Babcock, the Milwaukee firm's information processing manager.

Babcock also predicted that with SNA the company's 370/168 will not need a byte channel "if we get everything into a hardware environment that will operate on a block channel." To capitalize on these expected benefits, Schlitz has already begun to implement SNA at its corporate headquarters, Babcock added.

Blue Cross/Blue Shield in Richmond, Va., is even further along in its installation schedule, having upgraded to SNA several months ago, operations manager Leo Harris, reported. As a result of this product move, Blue Cross/Blue Shield officials expect tobe able to attach a wide variety of peripherals to their 370/158, including floppy disk drives, CRT terminals and teleprinters.

'No Discernible Benefits'

Oscar Mayer Co. also has already upgraded to SNA, but computer manager Roger Tietz conceded that the installation thus far has yielded no discernible benefits. As state-of-the-art technology, however, he predicts the product will eventually allow the Madison, Wis., firm to link more than one remote site to its central data file.

Tietz regards SNA's newness as its primary drawback. "It doesn't always work," he noted.

Meanwhile, in the data communications part of the survey, users gave a wide variety of responses when asked to describe their hardware configurations. Schlitz, for example, operates three communications networks, Babcock said.

The first is a time-sharing system that links about 40 remote terminals to an IBM 370/168. Those terminals include a mix of IBM 3277 and Tektronix video displays plus several Anderson-Jacobsen, Texas Instruments and Decwriter hard-copy machines.

The second Schlitz network incorporates eight IBM 3276 RJE terminals at the company's remote plants. These terminals link to the firm's central 370/168 in Milwaukee over leased communications lines.

Schlitz's third data communications net is a wholesaler information system that connects the central mainframe by Wats lines to ITT Ascii-Scopes at 300 wholesaler sites.

More Multiple Nets

Ashland Oil Co. also operates more than one communications net. Two of the Ashland, Ky., firm's sites perform RJE applications, while a third network uses Sycor terminals to do interactive jobs, according to Stan Wonn, the company's administrative assistant for computer science and services.

Those terminals include Model 350s, 351s, 250s and 257s, Wonn added.

At Chase Manhattan Bank's trust department, a Control Data Corp. Cyber 1000 message-switching center connects to 200 remote sites equipped with Model 37 teletypewriters. Chase also plans soon to connect its 370/168 to the Swift banking network, senior vice-president William Shine reported.

Chase's communications vehicles include leased lines and satellite transmissions with switching networks in Hong Kong and Tokyo.

IBM Makes Price Revisions

(Continued from Page 1)

for certain maintenance and support services, while some monthly maintenance fees decreased up to 20%, the spokesman said.

Monthly maintenance for the System 3 Model 4 has gone up approximately 10% from $145 to $160.

Systems engineering has also increased with General Systems Division systems engineering costing approximately 15% more and DP Division systems engineering costing 10% more.

Education fees for certain customer education courses have gone up approximately 15%, the spokesman added.

In other typical maintenance price decreases, upkeep for a 370/155 with 512K bytes of main memory was reduced from $2,065/mo to $1,860/mo. The 370/165 maintenance was reduced 5%, all of System/7 maintenance was reduced 10% and System/3 models 6 and 8 maintenance was reduced 5%. The Model 15 maintenance was reduced 10%.

The price changes reflect a normal business review, the spokesman said.

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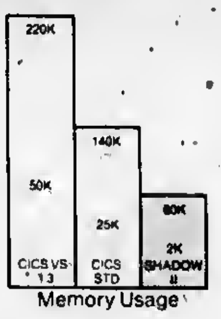
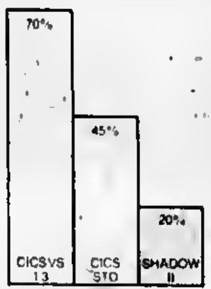
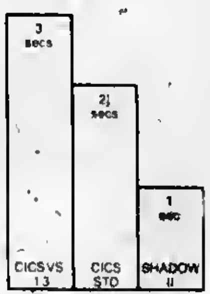


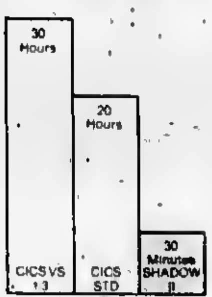
Memory Usage



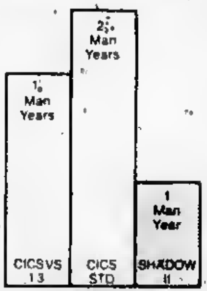
CPU Utilisation



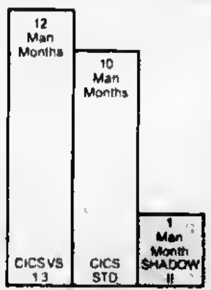
Response Times



Installation Time



Application Development Time



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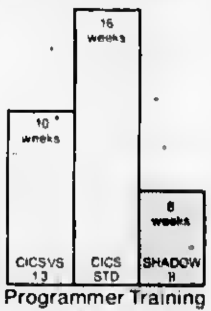
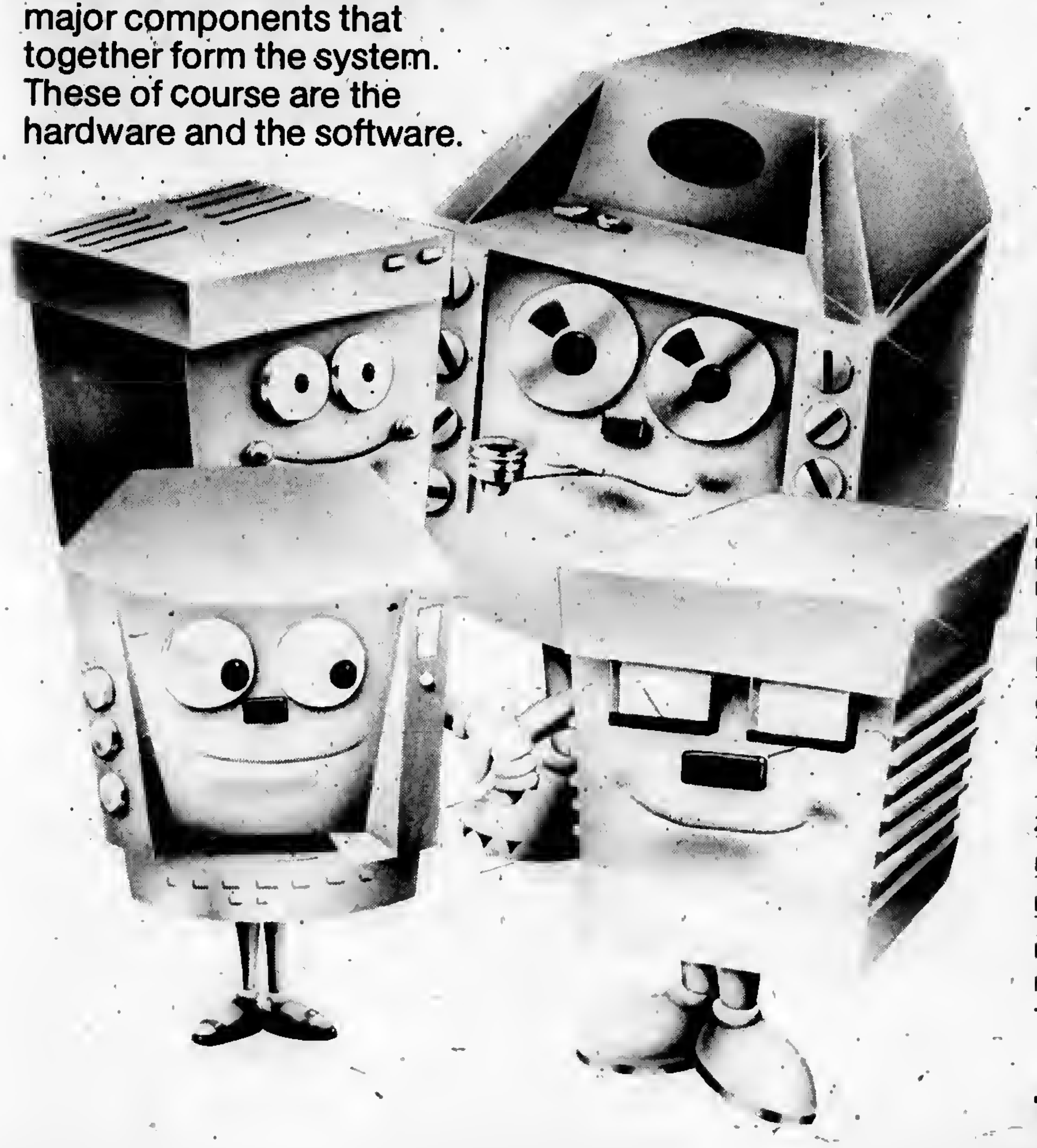


Programmer Training and Learning Curve



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Lists First-Year Priorities

Afips Suggests Study Areas for Congress' OTA

WASHINGTON, D.C. – The Congressional Office of Technology Assessment (OTA) should tackle such issues as standards, legal protection for software and data bases, privacy and security in its first-year study of telecommunications, computer and information policies, according to the American Federation of Information Processing Societies (Afips).

Afips is participating in an OTA planning study to determine just where the Congress' technology adviser should spend its money and manpower in the information technologies. The federation also recommended that a first-year program include assessments of electronic mail, electronic funds transfer systems (EFTS) and new applications and techniques resulting from the convergence of computer and communications technologies.

Afips is one of several members of a working group on telecommunications, computers and information established by OTA to hammer out those issue areas the congressional office should initially examine.

The working group met here for the first time last May with 75 people attending. It includes such interested parties at AT&T and IBM, consultant firms such as the Rand Corp. and Arthur D. Little, Inc. and selected executive agencies including the Federal Communications Commission and the White House Office of Telecommunications Policy.

Kennedy Proposed

The original proposal for a fully funded OTA information technology assessment came from Sen. Edward M. Kennedy (D-Mass.) who, in January, suggested that OTA assess the development and application of information technology from 1977 to 1990, an Afips spokesman said.

The Congressional Board of OTA, chaired by Kennedy, devised the planning study and funded it with $75,000. Dr. Leland L. Johnson of the Rand Corp. is serving as an OTA consultant and is responsible for putting the working group's recommendations into a coherent report to the board on what should be done to inform members of Congress about developments in the information technologies.

"Relevance to congressional concerns will govern the selection of projects to be undertaken by OTA," Johnson said. In the midst of his draft report to the OTA Congressional Board, he added that his sources are the May working group meeting, surveys of public materials, informal conversations with individuals and organizations in Washington and Afips' formal proposal.

Technology List

In hopes of meeting congressional concerns, Afips has proposed a list that emphasizes the immediate information technology issues facing the legislature. Not only do budgetary constraints necessitate a limited OTA program, but the "dynamic change" that the computer and communications technologies are undergoing makes specific predictions beyond 10 years "conjectural and of somewhat dubious value," the federation noted.

". . . In its next session Congress will likely consider legislation related to national telecommunications policy, electronic banking, electronic mail, privacy, computer and telecommunications security, computer crime, standards and copyright protection for computer programs," Philip S. Nyborg, Afips' Washington office director, wrote in a letter to Johnson.

"Clearly, these policy issues have major technological components, and Congress will have substantial need for a credible, accurate and independent source of technical information," he said.

Best Approach

From the viewpoint of Afips' constituent societies, Congress would be served best by an OTA which gives its memebers an independent basis on which to make legislative decisions in technical areas, Nyborg stressed.

If OTA has money left over after delving into projects recommended by Afip[illegible] primary consideration, the congressional office should then examine the adequacy of existing computer systems audit and control techniques, educational technology and alternative regulatory approaches regarding offerings of mixed communications and DP services, the federation said.

While Afips recommended that every project selected for study by OTA specifically relate to either pending or proposed legislation or to congressional oversight responsibilities, the federation also urged sufficient OTA budget flexibility to permit the office to alert Congress to issues emerging in the information technologies.

Johnson said he considered Afips' proposal authoritative because it represents a consensus of this group of experts. The OTA consultant called it "an important input into the larger report."

That larger report should be presented to the Congressional OTA Board sometime before the end of this month.

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IBM Designed to Monopolize: McAdams

By Catherine Arnst
CW Staff

NEW YORK — It was IBM's intent to monopolize — not its "skill, foresight and industry" — that caused the firm to develop new products, an economist testified at the U.S. vs. IBM antitrust trial recently.

Dr. Alan K. McAdams, the Justice Department's chief economic advisor for this case, used the phrase "skill, foresight and industry" as a shorthand economic description of actions a firm takes that are motivated solely by the desire to benefit the consumer.

Although IBM may have a reputation for those types of actions, the company actually has introduced most of its product changes and price cuts out of a desire to contain competition, McAdams claimed.

His analysis is crucial to the government's case because it is part of its attempt to prove that IBM had an intent to monopolize the computer industry. Section Two of the Sherman Antitrust Act, under which this suit was brought, requires that intent be shown, and it is often the proof of such intent that is the most difficult aspect of an antitrust case.

'Fighting Machines'

The government spent 10 weeks last fall presenting the "fighting machines" portion of its case [CW, Oct. 11, 18], which McAdams cited in support of his conclusions. "Fighting machines" were those systems IBM allegedly announced and for which it prematurely took orders in order to undermine competitive systems. In some cases, such as with it's time-sharing system, IBM never filled its promises, the government claims.

The government specifically accused IBM of using this technique with the 360/90, 67 and 44 computer systems. McAdams also used the example of the 370/125, announced in August 1972, as a machine IBM announced only to solidify its monopoly position.

The 370/125 was designed to impact Memorex Corp., which was then expanding into the systems market, McAdams said. Memorex had already cut into IBM's installed disk drive base and the firm wanted to keep the newcomer from expanding any further, he testified.

The 125 was announced with a virtual operating system, a first for IBM. This meant it required new peripherals, as the old ones would be incompatible. This was a departure from IBM's original plan to make all 370 systems' interfaces compatible in order that users could switch systems easily.

The result was that none of the disk drives manufactured by plug-compatible peripherals manufacturers could interface with the new IBM system, and a new design effort had to be mounted by these firms, McAdams said. It was IBM's plan when it announced the 125 to impact the plug-compatible firms, and particularly Memorex, when it announced this system, he said.

IBM ran into a number of problems with the 125 and the CPU had to be redesigned after the announcement was made, McAdams said. In addition, the system was ready before IBM completed its new disk drive which would provide unique capabilities, according to IBM promises, he continued. Users eventually had to wait over a year before they could receive all the features they were promised with the 125, he said.

The 125 was considered "an absolute disaster," according to one internal IBM document, but it did succeed in putting Memorex out of the systems business, McAdams said. The 125 product strategy was evolved to impact competitors, it degraded product capabilities and IBM failed to meet its promises. However, it was a success in the sense that IBM was able to maintain its monopoly position, he said.

Although IBM did not use "skill, foresight and industry" when planning new products, it did gain such a reputation because it was able to outpromise everyone else, McAdams said. IBM could not live up to its promises, but by making them, it forced other firms to make inflated promises also, he added.

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Town Wins Funding Settlement; DP Exonerated

By Ann Dooley
CW Staff

WORCESTER, Vt. — Denied federal funds because of an alleged computer error, this town sued the Economic Development Administration (EDA) and funds were restored in an out-of-court settlement.

Worcester town officials got the funding restored by proving that there was no computer foul-up and that federal officials "took the easy way out" by substituting zeros for unemployment figures that would have made the town eligible for funds.

The $4 billion federal public works jobs program, designed to alleviate unemployment around the country, was based on unemployment levels in each city and town.

Since no federal statistics are compiled for unincorporated towns or those with a population of less than 2,500, the EDA simply assigned a zero to those towns — instead of using local statistics as ordered by the federal government.

The zero automatically disqualified such towns from receiving any public funding under the program.

Officials of Worcester, which has an unemployment rate of 13%, were surprised to receive no funding while neighboring towns received more than they requested. They asked Tom Evslin, an employee of the software development firm Solutions, Inc., to investigate the matter.

Evslin was first told that it was a computer error which could not be fixed. Then, using the Freedom of Information Act, he requested background materials from DP people in the agency, who then sent him printouts and showed him their programming instructions.

The printouts indicated the programming was correctly done but that the instructions given the programmers were not in compliance with the law.

When the town learned this, it brought suit.

16 Suits Filed

Sixteen such suits have been filed against the EDA, but Worcester — population 700 — is the only one so far to win its case, according to Evslin.

The town was awarded $364,000 and plans to use the money to build an addition to the elementary school. Worcester was joined in the lawsuit by three neighboring towns for a total joint settlement of $535,000.

The EDA settled out of court because it didn't want to set a precedent, according to Evslin. The case "is an open admission that EDA is wrong," according to Robert Pope, attorney for seven towns in North Carolina involved in a similar suit.

But the EDA contends the decision was only the opinion of one judge and that the agency will take all its other cases to the Supreme Court if necessary, according to Evslin.

What the whole thing amounts to is that the EDA didn't want to bother with the small towns and pinned the blame on the computer, he said. However, as in many such cases of alleged computer error, it turned out to be the human factor which caused the problem, he added.

"The only way we succeeded where other towns haven't is that we had a knowledge of computers and a knowledge of the Freedom of Information Act," Evslin said.

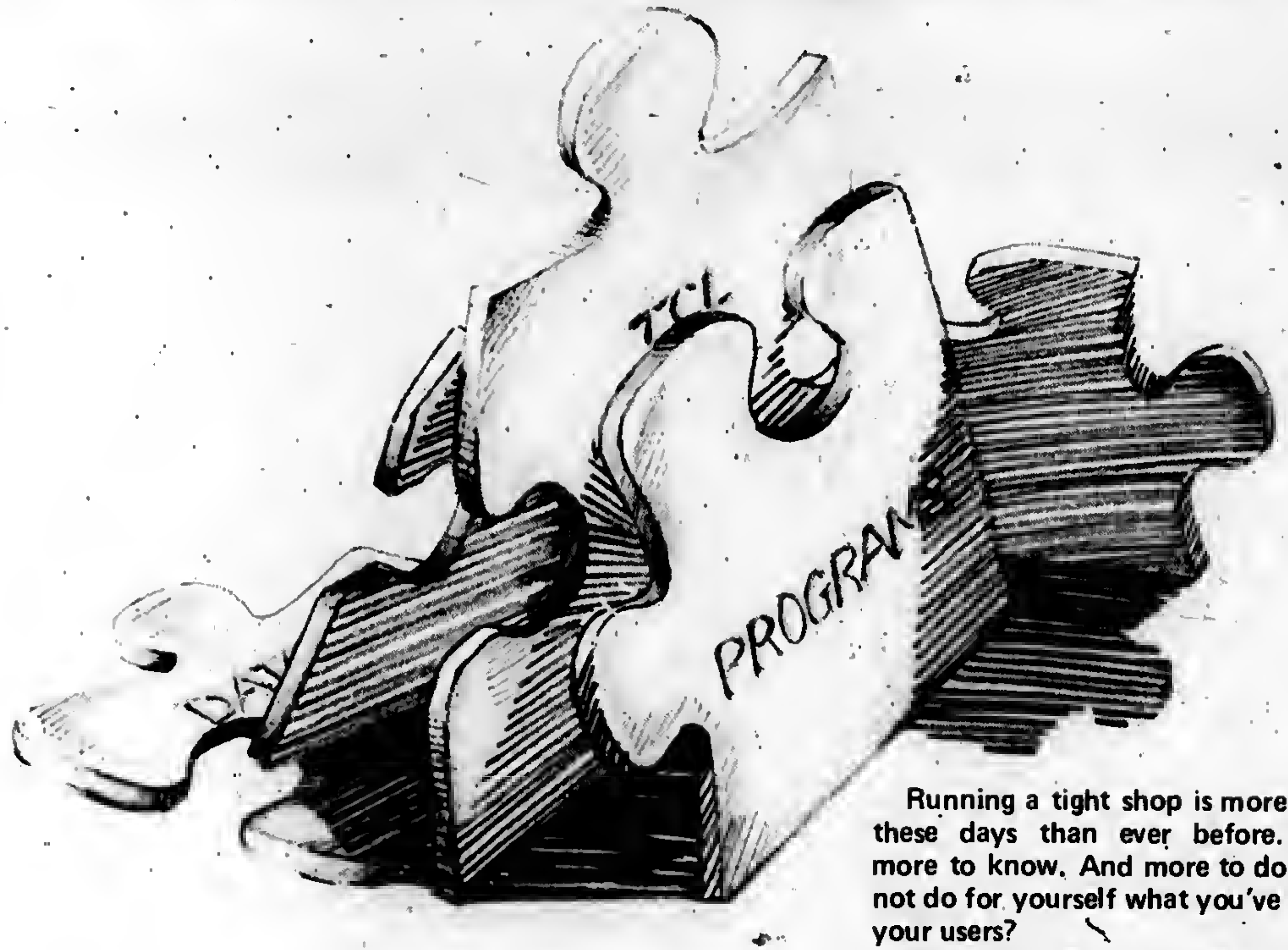
The printouts showed the zeros were invented and not observed, the rules were not being followed and the computer was being used as a smokescreen, he said. In addition to the computer knowledge, someone in town worked for a congressman and knew how to avoid the red tape in the Freedom of Information Act, he said. That way the information was received in less than a month, he added.

Few small towns have that combination of expertise, he noted.

"Now we have the information to help any town win its case," Evslin said, although it's probably too late to help any community that hasn't already filed suit. The deadline for allocations by the EDA is Sept. 30.

"No one knows what will happen if the suits aren't settled by then," he said adding many towns are still unaware of what happened to them.

Get It All Together...



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Users 'Sour' on NCR Maintenance Proposal

By Toni Wiseman
CW Staff

While the status of NCR's new maintenance policy remains uncertain, users interviewed recently were unanimously disturbed, negative and "sour on the deal" NCR is proposing — a virtual halt to user-to-user sales since there are no longer any guarantees of maintenance [CW, Sept. 5].

The users said they had not yet seen anything purported to be a final draft of the policy. However, they had received, from various sources, copies of an Aug. 5 NCR marketing communication from E.F. Shipman, senior vice-president of domestic marketing, to all regional directors and district managers. The memo outlined NCR's intentions and, at this time, those intentions stand as the rules by which all field offices must operate until further notice, according to one user.

Shipman's Memo

The NCR memo stated, "It is NCR's intent to support our customers in their use of NCR equipment. We do not intend to support non-NCR competitive equipment added to NCR systems, nor can we support unauthorized modifications to NCR equipment.

"The primary purpose of NCR's Field Engineering Division is to support the marketing effort and strategy of the NCR Marketing Division, and we feel no obligation to support the marketing efforts of others."

Several users view this as a clear move to put brokers and third-party firms out of business.

Frank Kolebuck, DP manager for La-Z-Boy Chair Co., noted, however, that there are really only three dealers doing any volume of business in NCR equipment — Harwoods and Associates, Computer Connection Corp. and Computer Enhancement Corp.

Another area of concern is the flat rate for the prerequisite "review" of used gear prior to certification for maintenance. Shipman's memo stated that "Installation and certification prices will be 50% of the established Zone 1 maintenance rates. This one-time charge to the customer will be made to cover the expense of cabling the unit or system, physical and technical inspection, diagnostic procedures, replacement of defective modules, installations of any applicable modifications and other work required to place the equipment in acceptable condition for reliable operation. The replacement parts and/or modules will be charged to the customer."

NCR has assured users this policy is in their best interest, in the event of serious problems with the equipment. Kolebuck observed, however, that on a printer La-Z-Boy had installed, the flat rate was $2,800 for a job he said anyone could do in two days or less. "Even if the time and materials fee were $65/hour, it would have only cost $1,000," he said.

Jon Pershing, DP manager for Dunn-Edwards Corp., said he was "definitely flat against anything of this nature. It completely voids the value of the equipment we own."

He added his superior had voiced the opinion that the policy is possibly an illegal contract and therefore will not be enforceable. If it can be enforced, however, Dunn-Edwards would be hesitant about buying further NCR equipment, though some might be leased. NCR has been its vendor for eight years, he said.

William Henderson of the First National Bank of Lake Forest feels NCR is justified in taking this stand, but does not think the firm will ever make it work.

'Close to Zero'

Henderson said his initial reaction was "Hey, you just dropped the value of my system close to zero." The reason behind his statement was he has neither the contacts nor the time to go through sales negotiations while there are well qualified people all across the country who know NCR equipment and know where potential purchasers for his equipment are.

He noted he had previously purchased equipment from brokers, but had always been careful to get the serial numbers and "get it in black and white from NCR that they would put this equipment on a maintenance policy for me."

Henderson said he would still buy used equipment under the "unofficial" policy, with NCR's full knowledge, "but I just don't think they can back this policy up."

Many of the users, including Hani Durzy of First Bank Corp., feel the policy takes the buyer into consideration, but not the seller. The Catch-22 is that in most cases the seller is also a buyer, since most equipment is bought and sold as replacements.

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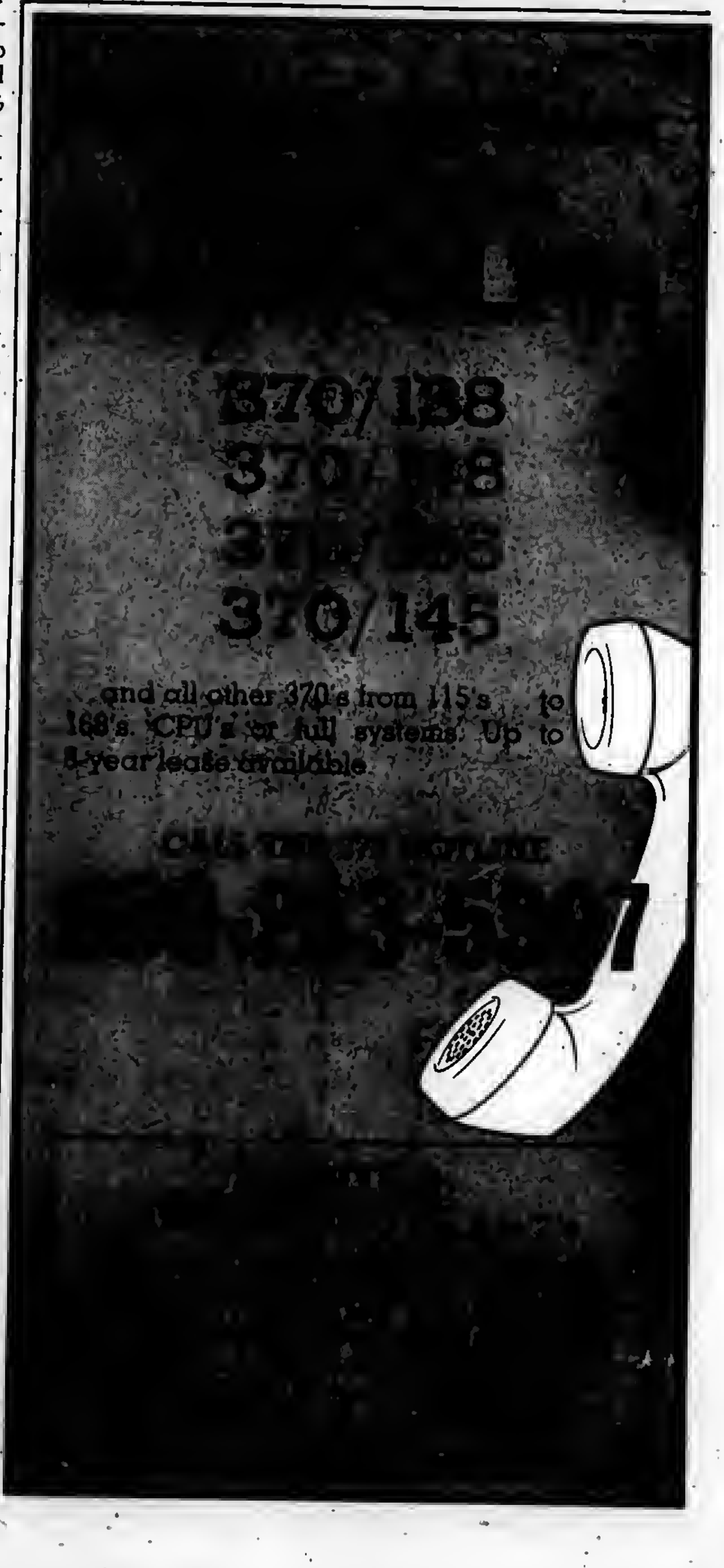
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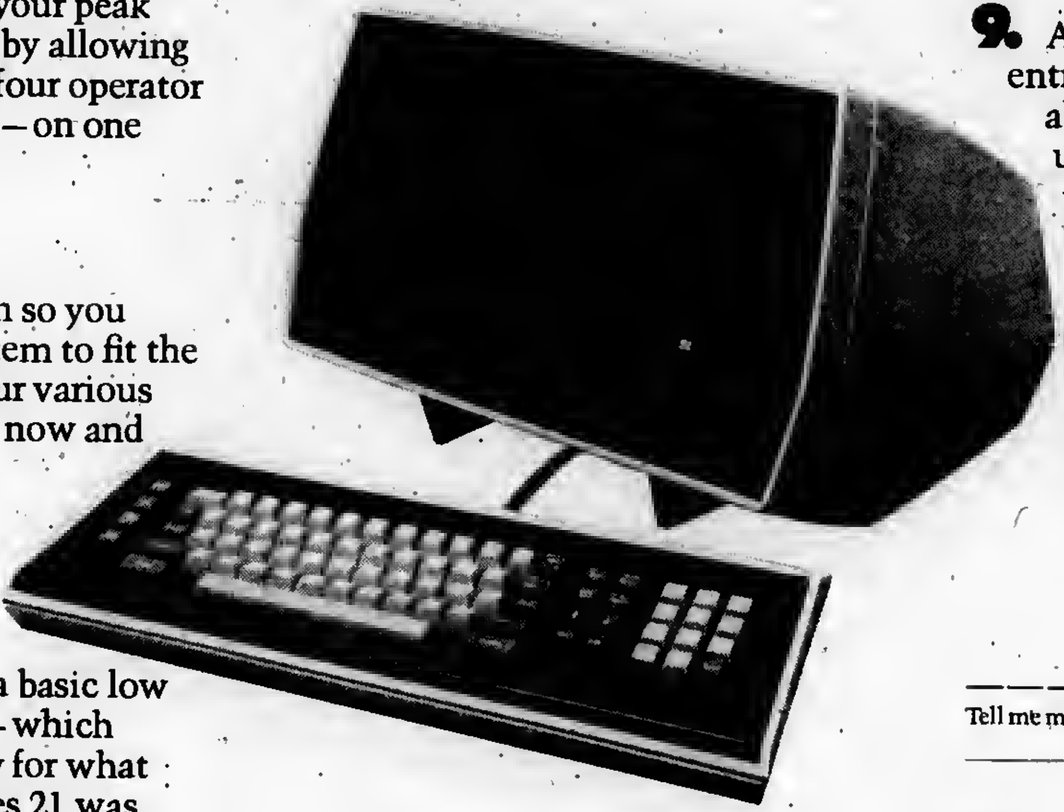

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More Jobs, Efficiency Urged for French DP

By Nancy French
CW Staff

PARIS — Although data processing has made sweeping changes in the everyday life of the Parisian, few Frenchmen outside this capital city are even aware that the computer exists, according to Rene Monory, minister of industry, trade and crafts.

Speaking here last week at the opening of the Convention Informatique, an annual conference that attracts a crowd of about 2,000 from France and French-speaking countries, Monory emphasized the theme of bringing DP under control.

Control means providing more jobs in DP without increasing the rate of unemployment among unskilled workers, many of whose functions the computer will assume, he said.

It means decentralizing the concentration of computers in the Paris metropolitan area, where 70% of the installations are located; and helping existing users increase their efficiency and reduce costs.

The government alone, which accounts for 40% of all data processing activity in France, aims to cut implementation costs by half and save 10% to 15% on existing installations, he added.

In his speech, delivered in French and translated simultaneously into English, Monory noted the DP industry is a vital element of the French economy, responsible for a "turnover" of 10.5 billion francs per year. It employs 65,000 individuals and accounts for 40% of the nation's exports, he said.

Last year, the installed base of computers in France was valued at 32 billion francs, up from 17 billion francs in 1972. The value is expected to reach 64 billion francs by 1980, according to Monory.

Sources here believe that goal is achievable largely because most small and medium-sized companies in the nation are not yet computerized. As Monory pointed out, more than two-thirds of all computers are located in Paris, which accounts for only 20% to 30% of the nation's population.

Government Role

Monory attributed the success of the French DP industry to the government's role in restructuring the marketplace through support of CII/Honeywell Bull, which now claims an estimated 28% of the nation's installed base of large computer systems. Fifty percent of all large installations are still IBM, and it is this nation's goal to overtake IBM here by 1980, he said. This goal, too, is believed to be within reason, sources said.

At the moment, leftist politicians are squabbling over whether CII/-Honeywell Bull should be nationalized. If a leftist coalition should come to power in France's elections next March, CII/Honeywell Bull might be among the firms that could face the prospect of being taken over by the government. That prospect seems unlikely now, but observers here were somewhat less confident a short time ago.

The French government is pursuing a three-pronged policy toward this nation's computerization. First, it is promoting DP within the administration — or civil service — as a means of guaranteeing the existence of an autonomous national DP industry and maintaining a favorable balance of trade.

Second, it is seeking better ways for the government to process its data and develop new applications. And finally, it is encouraging small- and medium-sized companies to use computers.

According to Monory, the software firms "should be the motor behind the drive to computerization," for only they can capitalize on the experience of each user and disseminate the results, he said.

This is the first time the French service industry, whose revenues are second only to those of services in the U.S., has been given official recognition as a major factor in the computerization of France, sources said.

In conjunction with this, Monory said he plans to create a national center for DP experiments and applications to carry out, on demand, studies on cost performance for large government systems.

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld.*

In the ten years since Data Base Management Systems were introduced they've grown to a multimillion dollar subindustry in their own right. As late as 1973, less than 1,000 DBMS were installed; but International Data Corp. estimates that over 5,000 are in use today, and this number will increase to 8,200 in the next two years. This phenomenal growth has been fueled by the hoped-for benefits of DBMS, which include increased programmer efficiency, the elimination of redundant information in the data file, and greater ease in coping with system upgrades and reprogramming.

But a data base management system should be evaluated carefully before you commit to purchase. They have developed such a reputation as problem solvers that people tend to expect more from them than they can achieve, while overlooking or minimizing the effort required.

We'll have several experts on hand to help you arrive at a realistic understanding of DBMS in our October 31st special report edited by Don Leavitt. Here is a sampling of the kinds of articles you'll see:

- Combatting the "Holy Grail" syndrome — Being realistic about the benefits that are possible in relation to the effort required; how to assess whether DBMS will enable you to reach your goals.
- How well are installed systems living up to expectations? A review of typical problems that need to be overcome.
- The role of the Data Base Administrator in DBMS — including considerations like the physical arrangement of the data base.
- How dictionary packages, report writers, etc. interface with DBMS software.
- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Second, that installation now puts all of your 3277-type terminals in local mode, as if they were right at your host CPU site, attached to a byte MUX channel.

Third, now that your CRT stations are in local mode, polling is totally eliminated. Every 3277 is served on a demand basis, as if it were the only terminal on the network. Nor is there any need for polling software overhead. You don't need it.

Fourth, the result of this systems configuration is improved response time for every 3277, regardless of its location. On average, that improvement will be about four times better than what you now achieve: from an average of eight seconds, to just under two seconds. For *every* 3277, consistently.

Fifth, no remote terminal access software is needed. None. No remote BTAM or remote TCAM if you operate under non-virtual methods. No VTAM and related NCP front-end software (there is no front-end) if you operate under virtual technology. That feature alone saves you months of effort.

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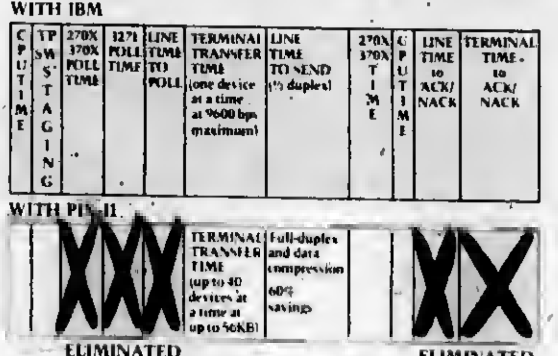
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The above illustration depicts the typical sequence involved in executing a single 3270 transaction under IBM protocol – and the many little ways in which PIX-II eliminates or reduces many of those sequences. Can you afford not to find out more about PIX-II?

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Three Special Sessions Set At Info/Expo Next Week

WASHINGTON, D.C. — State software taxation, privacy and software acquisition management will be spotlighted in three special sessions during the Data Processing Management Association's (DPMA) Info/Expo '77 conference here Oct. 9-12.

Robert Sherin, president of Nova Computing Co., will moderate a software taxation seminar Oct. 10 from 7 p.m. to 8:30 p.m. The seminar will discuss the current status of software sales tax legislation and its impact on computer operations.

The privacy session, entitled "An Analysis of the Impact of 1977 Privacy Legislation," will be held Oct. 11 from 6 p.m. to 9 p.m. and will consist of a panel discussion.

Panelists will include Robert Smith, editor of "The Privacy Journal;" Carole Parsons, executive director of the federal Privacy Protection Study Commission; Donn B. Parker, senior consultant, Stanford Research Institute; Wright Andrews, partner in Sutherland, Asbill & Brennan, a Washington law firm; and the DPMA's international vice-president, George R. Eggert.

"Software Acquisition Management for Department of Defense Command Control Communications Systems" is the title of the third seminar Oct. 11 that will take place between 3 p.m. and 5 p.m.

Those attending Info/Expo can attend the seminars free of charge. Further information on the conference is available from the DPMA at 505 Busse Highway, Park Ridge, Ill. 60068.

SCDP Slates Oct. 13 Meet

MEMPHIS, Tenn. — The Society of Certified Data Processors (SCDP) has scheduled its annual conference for Oct. 13, in Washington, D.C. — immediately following Info/Expo '77, sponsored there by the Data Processing Management Association (DPMA).

The one-day SCDP conference at the Washington Hilton Hotel will focus on "The Future of the Certificate in Data Processing."

Speakers will include Fred Harris, past president of the Institute for the Certification of Computer Professionals (ICCP); Beverly Madron, acting president of the DPMA's provisional special interest group on the Certificate in Data Processing; Kenniston W. Lord Jr., past SCDP president; Dr. G. Gary Casper, president of ICCP and SCDP; and Jerry J. Martin, ICCP treasurer and SCDP vice-president.

The registration fee of $50 includes the conference, luncheon and hospitality suite. Further information is available from Tommy Briggs, SCDP, Suite 532, 2670 Union Ext., Memphis, Tenn. 38112.

Calendar

Oct. 13, Washington, D.C. — **Seminar on DP Auditing: Should the Public Depend On It?** Contact: Paul McEwen, U.S. Department of Treasury, Bureau of Alcohol, Tobacco and Firearms, Office of Inspection, P.O. Box 6199, Washington, D.C. 20090.

Oct 17-19, New York — **ISC Security East Conference.** Contact: Executive Director, International Security Conference, 2639 S. LaCienega Blvd., Los Angeles, Calif. 90034.

Nov. 1-3, Los Angeles — **Interface West Conference,** Contact: Interface West, 160 Speen St., Framingham, Mass. 01701.

Nov. 1-3, Woburn, Mass. — **New England Printed Circuits and Microelectronics Exposition,** sponsored by Industrial & Scientific Conference Management, Inc. (ISCM). Contact: Vic Pariso, ISCM, 222 West Adams, Chicago, Ill. 60606.

Nov. 1-3, Detroit, Mich. — **CAD/CAM V,** sponsored by the Computer and Automated Systems Association of the Society of Manufacturing Engineers (SME). Contact: Exposition Department, SME, 20501 Ford Road, P.O. Box 930, Dearborn, Mich. 48128.

Nov. 1-3, San Francisco — **1977 Business Equipment Show,** sponsored by the Administrative Management Society. Contact: Cartlidge & Associates, Suite C. 415 Clyde Ave., Mountain View, Calif. 94043.

Nov. 1-3, Chicago — **Second Conference on Designing to Survive Extreme Disasters.** Contact: Keith McKee, Conference Co-Chairman, IIT Research Institute, 10 W. 35th St., Chicago, Ill. 60616.

Nov. 2, Hartford, Conn. — **Meeting on Documentation Management.** Contact: Paul Fitterer, The Torrington Co., 59 Field St., Torrington, Conn. 06790.

Nov. 2-3, New York — **Seminar on Computer Security Survival,** sponsored by the Association of Data Processing Service Organizations (Adapso.) Contact: Joseph Hoey, Dataguard, 733 Third Ave., New York, N.Y. 10017.

Nov. 2-5, Dearborn, Mich. — **Annual Convention of the National Association of Users of Computer Applications to Learning.** Contact: John S. Camp and Lary Smith, Conference Co-Chairmen, Wayne County Intermediate School District, 33500 Van Born Road, Wayne, Mich. 48185.

Nov. 3, Boston — **Electronic Funds Transfer: The Commission Report and Beyond,** sponsored by the Computer Law Association. Contact: Robert Bigelow, Room 2200, 28 State St., Boston, Mass. 02109.

Nov. 3-5, New York — **Eastern Regional Operations & Automation Workshop,** sponsored by the American Bankers Association (ABA). Contact: ABA, 1120 Connecticut Ave., N.W., Washington, D.C. 20036.

Nov. 6-9, Houston — **Bank Administration Institute (BAI) 53rd National Convention.** Contact: BAI, Meeting Services Division, P.O. Box 500, Park Ridge, Ill. 60068.

Nov. 7-11, San Francisco — **On-Line Network Systems and Data Base Systems Conference,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: AIIE Seminars, Department PR, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 8-10, London — **Compek UK 1977,** computer peripherals exhibition. Contact: Iliffe Promotions Ltd., Dorset House, Stamford St., London SE1 9LU, England.

Nov. 8-11, Chicago — **Compsac '77,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: Compsac '77, P.O. Box 639, Silver Spring, Md. 20904.

Nov. 8-11, Toronto — **1977 Canadian Computer Show.** Contact: Derek A. Tidd, Show Manager, Industrial and Trade Shows of Canada, 481 University Ave., Toronto M5W 1A7, Canada.

Nov. 9-11, Toronto — **Office Efficiency Show,** Contact: Derek A. Tidd, Industrial and Trade Shows of Canada, 481 University Ave., Toronto M5W 1A7, Canada.

Nov. 9-11, Lubbock, Texas. — **Institute of Electrical and Electronics Engineers (IEEE)** International Pulsed Power Conference. Contact: Dr. T.R. Burkes, Department of Electrical Engineering, Texas Tech University, Lubbock, Texas 79409.

Nov. 10, Akron, Ohio — **Minicomputer Conference & Business Show.** Contact: Frank Thomas, University of Akron, Simmons Hall, 302 E. Buchtel Ave., Akron, Ohio 44325.

Nov. 14-16, Washington, D.C. — **Federal ADP Procurement: 1978 — The Year of Transition,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 14-16, Arlington, Va. — **International Model Building Conference,** sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

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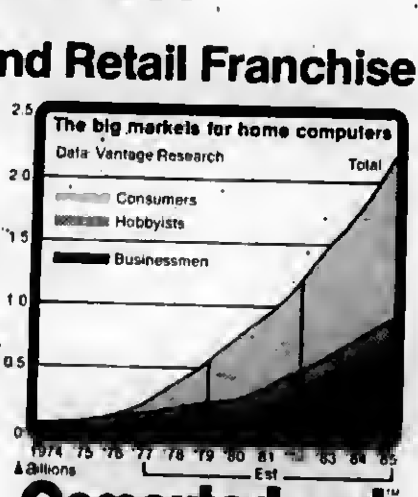

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Changed to 'Promote Competition'

NBS Official Defends I/O Standard Revision

By Molly Upton
CW Staff

WASHINGTON, D.C. — The revised plan for implementation by the federal government of the proposed channel-level I/O interface standard represents "everything we could do to promote competition," a spokesman for the National Bureau of Standards (NBS) said last week in defense of the plan.

Tom Pyke, chief of the Computer Systems Engineering Division at NBS' Institute for Computer Sciences & Technololgy, refuted charges that the proposed revision is "watered down" [CW, Sept.. 12]. Pyke's group was responsible for the revision, which he said seeks to "maximize all sources at every point."

Under the revised proposal to the Federal Information Processing Standard (Fips), the government can receive bids on a series of boxes from different sources as well as a system from a single vendor if the vendor offers to make at least one channel conform to the standard via an adapter, he said.

The effect on the government will be to increase its choices when buying peripherals, he explained.

The revised proposal allows agencies to install systems that don't have interfaces conforming to the standard. While Pyke claims this feature will promote competition and allow the government to obtain systems at less cost, critics charge the lack of requirements renders the standard unenforceable.

Pyke emphasized that the proposal requires vendors to assure they will make available, at an agreed-upon price, adapters that will conform the channel to the standard's specifications.

Vendors must demonstrate the interface works and conforms to the standard or provide "other means" of proof; such as citation of a previous demonstration on a similar configuration, Pyke said.

Critics have also charged the proposed changes in the federal government's implementation of the standard will make it difficult for procurement officers to evaluate the performance trade-offs of the adapters that might be later added to a system.

In drafting the revision, the engineering division tried to make sure that all can continue to participate in bidding for federal business, Pyke said.

The deadline for comments is Oct. 21. Written comments should be sent to Harry White, Associate Director for ADP Standards, Institute for Computer Sciences & Technology, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234.

Steel Honored By ACM Award

NEW YORK — Thomas B. Steel Jr., a founder of Share, has been chosen to receive the Association for Computing Machinery's (ACM) Distinguished Service Award.

ACM presents its highest service award annually to an individual "selected on the basis of the value and degree of his services to the computing community."

Steel was cited for his contributions to standards, an area in which he has worked "continuously and productively" since he was a member of the Share 709 standards committee in 1957-59 and a member of the American Standards Association X3.4.2 Language Standards Committee in 1960-61.

Steel was chairman of the U.S. American Standards Institute X3.4 Subcommittee on Common Programming Languages (1965-69) and a member of the ACM Standards Committee (1963-75) and of its Steering Committee (1963-68).

Steel was also chairman of the American National Standards Institute (Ansi) X3 Standards Planning and Requirements Committee (Sparc) (1969-74) and has been the Share representative to Ansi X3 since 1971. He has been chairman of the Ansi/X3/Sparc Data Base Study Group since 1973.

He has been the American Federation of Information Processing Societies (Afips) (and therefore the U.S.) representative to the International Federation of Information Processing (Ifip) TC2 (Programming Languages) Committee since 1963 and the chairman of that group since 1969. He has been the Afips member of the Ifip TC-2 Working Group 2.2 (Formal Languages Description) since 1966 and chairman of that group from 1966-72.

"Tom Steel was one of the founders of Share, the first and still the most prestigious user group," the ACM announcement said. He served Share in many capacities, including membership on its Executive Board (1965-66) and its board of directors (1973-75). He was on the committee that produced the well-known Share study of DP in 1980-85.

In addition to his work on the ACM Standards Committee, Steel was a member of the ACM National Program Committee (1963-66).

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Organizers of the annual DataComm Conference and Exposition have taken full advantage of the Washington, D.C. site to present special sessions on government involvement in data communications.

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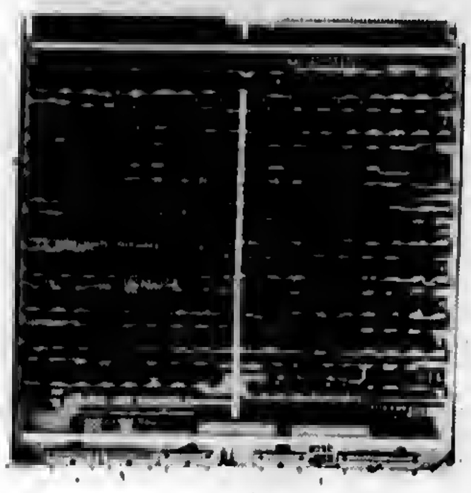

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System Helps Farms Avoid Losses From Potato Blight

HARRISBURG, Pa. — Potato farmers are teaming up with Pennsylvania State University's computer to fight potato blight and save the expense of unnecessary spraying.

Using a program written by Dr. Raymond A. Krause, formerly with Penn State, and information received from the farmers on recent weather conditions, the Penn State IBM 370/168 calculates whether spraying with fungicide is needed, according to Joe Peplinski, a senior research aid in the plant disease clinic.

With an average of 100 acres, a farmer can save $800 by avoiding a spraying, he said.

Once a week, a farmer can call in the data collected by a hygrothermograph located in his field. This instrument records on a strip chart the temperature and relative humidity. A terminal operator at Penn State adds this data to the farmer's file and promtly tells him the computer's recommendation on spraying, Peplinski said.

The service costs $100 for the season, and Penn State has about 62 farmers using it, he said. The same program is also being run at the universities of Maine and Michigan.

It made more sense to give the program out to other states because the work was too much for one university to handle, Peplinski observed.

The blight spreads during periods of humid weather and can attack the potato plants during any part of the growing season, he added.

NBS Lectures Now in Print

WASHINGTON, D.C. — The Government Printing Office has published a series of lectures by Dr. Edward Teller and seven other distinguished scientists and engineers on the current and future state of science and technology in America. The lectures, given in 1976, commemorate the 75th anniversary of the Commerce Department's National Bureau of Standards.

Teller's lecture introduces the 166-page publication and is entitled "Science and Technology in America: A Chronicle and Some Predictions." Also contained in the volume is a lecture entitled "Computers in Science and Technology," by Yale University's Alan Perlis.

Copies of the publication cost $2.50 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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Nov. 8—Systems and Software:
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SEE PAGE 3.

With Mini, TV Camera and CRTs

New York Matching Fingerprints in Two Hours

By Catherine Arnst
CW Staff

ALBANY, N.Y. — A minicomputer, a television camera and three terminals installed here recently constitute a "bona fide state-of-the-art development" in fingerprint classification, according to James Paley, the director of research and development for the New York State Division of Criminal Justice Services (DCJS).

The system, built by Rockwell International and installed in March, enables operators to scan the state's four million fingerprint cards and match those of the same individual in two to three hours, Paley said.

Designed by the DCJS and funded by a grant from the Law Enforcement Assistance Administration, the system consists of a Data General Corp. 820 minicomputer with three CRT terminals custom-built to DCJS specifications and a closed-circuit television camera.

When an arrest is made and fingerprints taken, the fingerprint card, containing prints of all 10 digits is sent by telephone to Albany over a statewide facsimile network. This determines whether the individual has had prior contact with the criminal justice system.

It takes approximately nine minutes to transmit the prints, Paley said.

When an operator receives the prints, he places each digit over the TV camera, which then transmits a picture of the print enlarged by a factor of 8 to the CRT screen.

The operator then identifies the print by pattern type and ridge count and transmits this information to the minicomputer.

The mini assembles the data and transmits it to twin Burroughs Corp. B770 computers, where the state's files are stored. A Burroughs 4000 printer produces a list of all persons in the file whose prints fit those characteristics.

More Accurate

Previously, the division used a manual fingerprint classification technique based on counting the ridges within a specific area of a fingerprint. The use of the television camera and CRT terminals has made the process far more accurate, Paley said.

"It is hard to quantify the difference this has made in our operation" in terms of time and money, he added. "We are doing more with less and the system has increased our internal throughput time, although it hasn't reduced the time involved in the overall operation."

The system is the first of its kind and there has been some interest in it from other agencies, Paley said. All the programs written in Fortran were done by the division and it took Rockwell approximately six months to build the system.

There were no problems in installing the system and it is fully operational, Paley said. There are no plans to expand the system at present; the state is instead trying to work out a way to completely automate its fingerprint files.

CDC Honored For Programs In Mental Health

WASHINGTON, D.C. — Control Data Corp. is one of five companies selected to receive an "Employer of the Year" award from the Mental Health Association and the President's Committee on Employment of the Handicapped.

According to Robert Leys, chairman of the 1977 panel of judges and the association's national vice-president for communications, CDC was selected for its multifaceted employee mental health program.

CDC's 32,000 employees nationwide have access to a free Employee Advisory Resource (EAR) program established to help employees and their dependents. Through this program, employees can work on solutions to personal or work-related programs.

A confidential telephone hotline operates seven days a week, 24 hours a day. EAR received 3,500 contacts for assistance in 1976.

Learning Centers

In addition to corporation-sponsored courses, CDC also gives discounts to employees interested in attending its Creative Learning Centers. Programs are offered on such topics as human potential, assertiveness for women, problem analysis and decision making, crafts and hobbies, fine arts, kitchen arts and courses for young people.

Leys feels that coming back into the world is the most important and difficult step for a person who has suffered emotional or mental illness.

"Stigma and prejudice are the enemies of those struggling to regain productive, self-reliant, healthy lives," he said. "American industry plays a big role in mental health.

"Many employers have made an extra effort to open their doors to those who have experienced mental disorders. This awards programs is an important step in the right direction."

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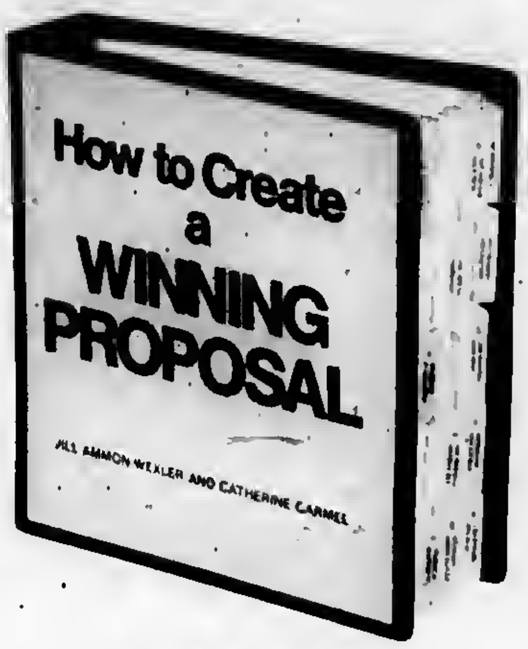
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Editorials

FYI

Cresting the Tide

The Waves of Change, a "soon-to-be-published book" that has been serialized in Computer*world* over the past seven months, will be published this fall by Advanced Computer Techniques Corp. (ACT).

The book, whose last chapter will appear here Oct. 17, discusses the economic, social and political forces that drive the computer industry and projects the future based on those forces.

Jammed with statistics and sophisticated analyses, the book can give everyone in the computer community — user and vendor alike — insight into the possible future scenarios for their installation and the industry.

The author, Charles P. Lecht, who is also president of ACT, has done an admirable job of weaving the various computer industry forces into a tapestry of unusual clarity.

Publishing the book in a serial form was somewhat of a departure for Computer*world* — it was the first time we published long, detailed analyses of the industry. Because the reponse has been excellent, we will continue to offer such articles in the future.

For more Information on the book — or to order your own copy — write to ACT at 437 Madison Ave., New York, N.Y. 10022.

Acting on Their Options

Computer*world* has received some questions — and arguments — about the survey of large user sites we recently conducted, so an explanation is in order.

The survey — admittedly limited to 20 large IBM sites — was designed to find out what those sites are planning to do over the next year or so in the areas of alternative mainframes, distributed processing and IBM's Systems Network Architecture.

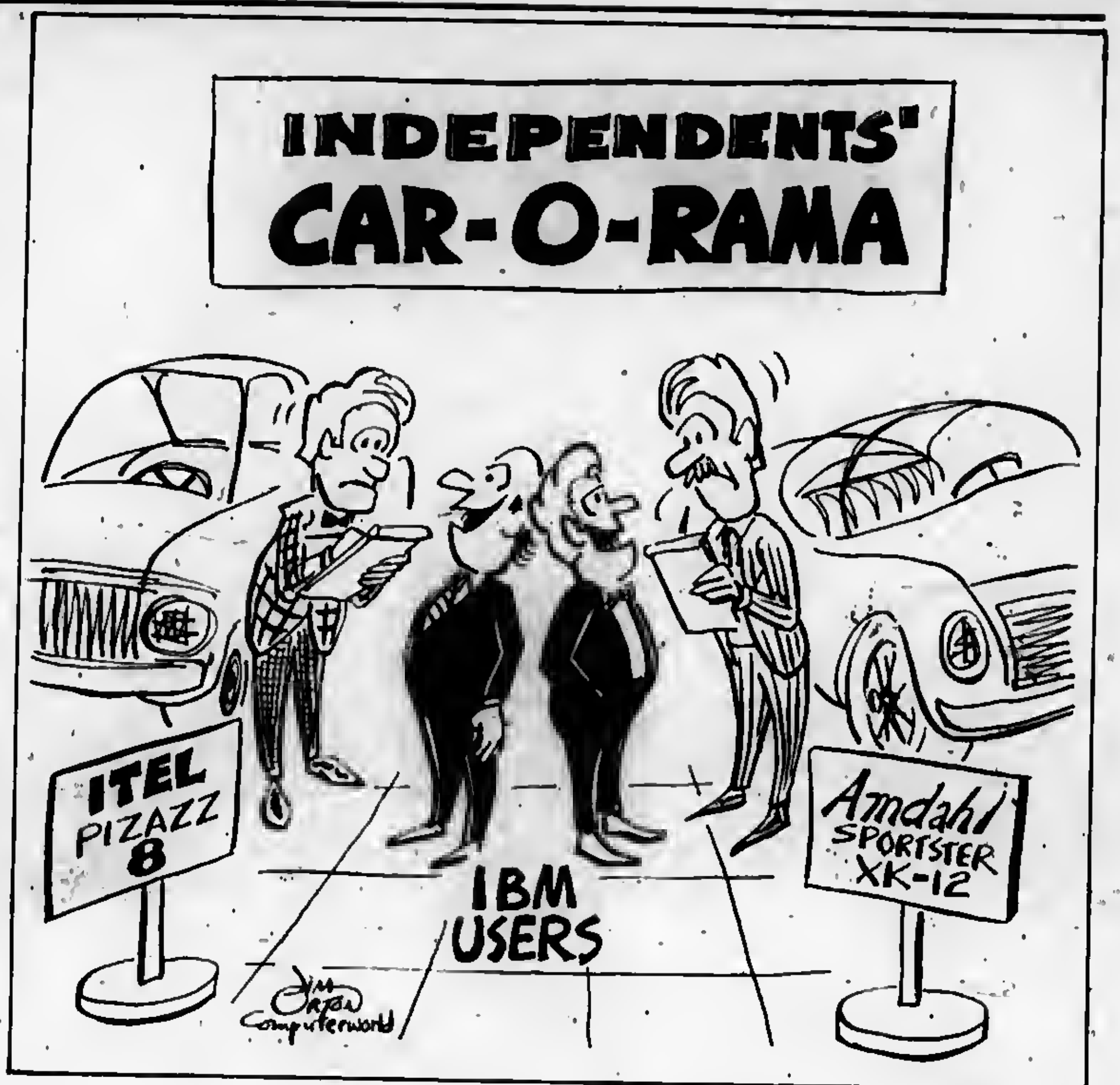
We deliberately did not survey sites that had already switched to alternative mainframes — over the past year we have covered many of those sites in detail. Likewise, we did not include sites which are well known as distributed processing users.

Instead, we concentrated on installations that were solidly within the IBM fold at the beginning of this year, just to see how they view these new developments.

The bulk of the users in existence today are IBM shops and we felt that a quick snapshot of what they are thinking and planning in regard to these new developments would be instructive.

We believe the survey has accomplished that purpose. Most shops we surveyed are evaluating the alternatives available and a surprisingly high percentage are actually switching to one or another of the alternatives.

If nothing else, the survey showed that users are well aware of the choices that will be available to them over the next few years and that they are beginning to act on those options.



'Not for Now . . . Just Looking'

Data Past

Eight Years Ago
Oct. 8, 1969

BEDFORD, Mass. — Viatron Computer Systems announced deliveries of the System 21 would begin Oct. 15. At the same time, Viatron announced two general-purpose computers. The smaller of the two with a 4K 16-bit word memory, the Model 2140, would rent for $99/mo in 1970. The larger, the 2150, with 8K 16-bit word memory, hardware multiply/divide and 24 I/O channels, would rent for $199/mo.

— — —

WALTHAM, Mass. — Honeywell, Inc. introduced a more powerful operating system for the medium-scale H-200 series CPU users. Dual job streams, communications and data transcription could be run simultaneously with the system, dubbed OS/200, permitting greater flexibility and more production for the machines, according to the company.

Five Years Ago
Oct. 4, 1972

PARIS — IBM introduced a data entry system for its European users. The vendor refused to comment on when the system, designed to provide improved data entry for its keypunch users, would be available in the U.S.

— — —

SACRAMENTO, Calif. — Evaluation of a nationwide intelligence network designed to track organized crime figures was underway. The system had been in operation for almost a year and tracked some 3,000 figures believed to be involved in organized crime.

Letters to the Editor

Too Many Taking 'Safe' Route

The article regarding alternatives to IBM CPUs [CW, Sept. 19] is misleading, to say the least.

The list of people surveyed includes many who, for whatever reason, chose not to avail themselves of the Amdahl superior price/performance alternatives, while including only two who have decided to switch.

I find it strange that 62 users who do have an Amdahl 470 weren't surveyed as to why they made the Amdahl choice.

It's not hard to understand why IBM continues to be called a monopoly with users such as you described responding to surveys. If IBM is a monopoly, it's those users who made them one and will continue to keep them with the "safe" approach.

Thank God for Gene Amdahls and DP people with the "guts" to take a chance.

J.J. Huelbig Jr.

Richmond, Va.

Mavericks of the '70s

I am not sure whether this letter should be titled "Shades of the 60's" or "Here We Go Again," but your recent articles on OEM CPUs prompt me to write.

Remember when the DP manager who installed OEM peripherals was considered a maverick? Remember when we heard from one computer operations manager after another saying, "It's all right for the other guy to use OEM peripherals, but my shop is different; I couldn't possibly use anything but IBM gear"?

Remember it all? Well, wake up, because the same thing is happening in the '70s, only this time it's CPUs.

Our job is to manage change, and the successful DP manager will not mistake inaction for conservatism. If alternatives are not studied openly and objectively, then the results are likely to be second rate.

From experience I can say that an OEM shop may not be the easiest to run, but then who said our job was going to be easy in the first place? Remember, it is the bottom line results against which we are all measured, whether we like it or not, and those that don't measure up will fall by the wayside to make room for those that do.

We are entering into a whole new era of data processing. The good managers will survive and prosper, as they should.

Michael S. George

Bridgeport, Conn.

Meaningful 'Hit Ratio'

If the "hit ratio" for the National Crime Information Center (NCIC) [CW, Sept. 12] means hits per number of inquiries, one would expect it to be low. If, however, hits are divided by the number of inquiries which *should* find a hit, then a low figure would be most alarming. It seems to me the first definition is worthless and the second, although difficult to determine, is meaningful.

The whole question is analogous to measuring picking efficiency in a warehouse. You throw out nonstock parts before you divide the number of attempts by the number of complete picks. In the case of the warehouse, you know that you don't expect to find the parts, so you don't count them in the total number of attempts.

R. Sides

Myrtle Beach, S.C.

(Other letters on Page 22.)

Must Analysts Be 'Renaissance' People?

By Jack Stone
Special to CW

Most users pin their hopes for success of a DP systems project on the skills, knowledge, communications capabilities and intelligence of the systems analyst. I often wonder just how many of these wishful thinkers know or appreciate how tough it is for the analyst to do his job - if for no other reason than there are so many tasks to get done in a typical project.

Paul Oyer, a long-term researcher of the analyst function and now with the U.S. Treasury, complained to me that DP management has generally burdened the journeyman analyst with more than 300 identifiable tasks which must be accomplished to succeed at the systems job.

He has loosely gathered these tasks around the following group headings: analyst, synthesist, salesmen, politician, listener, programmer, operator, designer, engineer, architect; writer, evaluator, futurist, model-builder, planner, theoretician, pragmatist, innovator, organizer, team leader/player, troubleshooter (sometimes "schemer"?), manager, statistician and decision-maker (or real chief executive?).

It is incumbent on the DP manager to establish proper guidelines with the local personnel department to ensure that recruitment policies mirror the current personnel needs of the DP organization. We surely can be thankful that the outpourings of Oyer's research and those of other students of the art of systems analysis will take forever and a day to ooze out into the field. Otherwise, the jobhopping analyst might be subjected to a recruitment interview that could go something like this:

Setting: The office of Clayton Buckingham, Director of Recruitment for Heptronics Corp. The company has a large-scale DP system installed for both engineering and administrative work. DP support for the engineering staff is in fine shape — it handles its own systems work. But a frantic search is on for analysts to help get the new payroll system on the air (it's now five years behind schedule).

Enter Morris Meadowbrook, an experienced analyst who built his nine-year career on the well-established growth ladder: college, programmer, junior analyst. He saw the full-page ads from Heptronics in the trade publications, decided that he, too, wanted to get involved and walked in off the street.

"Come right in, Mr. Meadowbrook, come right in here! Please sit down and let's get right to it! We here in Heptronics personnel have a right good idea of what our computer folks went to see in their new people. So let's start with a few questions about your background. Would you first tell me what selling experience you have had? I mean, precisely what type of sales territory did you have with IBM?"

"Well, now, I am a professional systems analyst, and people of my ilk never have computer sales experience. It really isn't the image that we are trying to project for our profession. I did, however, sell encyclopedias door-to-door during my high school summers, an experience which well prepared me for dealing with my current users."

The Human Connection

"Encycloooo, — yes, uh, oh, well, let's move on to the next one. Can you describe some of the models you have built in recent years?"

"By all means! At college, while others wasted their time on social activities, I concentrated on extending my intellectual powers. I took up the hobby of building large mechanical structures out of toothpicks and glue. My crowning achievement was an exact replica of the Eiffel Tower, 44 inches high, although I must admit that it tended to lean in the summers when the glue softened."

"Let me ask the question in a different way: Did you carry out any simulation projects?"

"Oh, I see what you are getting at! I broadened my experinece in this dimension by taking a special course in mime just a few years ago. By the way, this background gave me the basis for developing my new theory of "Structured Independence," a compilation of original methodologies for ensuring that the rugged individualism of the DP analyst shall never perish from this earth."

"Perhaps, Morris, I should try another tack. Tell me about your successes as a team leader."

"As an avocation, I organized a primal therapy group in which I have had the honor of being the lead screamer for more than two years. Gosh, this experience has just been invaluable in relaxing me from the workaday travail."

"How about this one? Any troubleshooting jobs?"

"Got it! I was a naval electronics technician aboard a carrier during the Vietnam war."

"Good to hear, sooo good to hear! Tell me more!"

"Well, really there wasn't all that much to it. When some hardware system failed, I just replaced boxes until the system started up. Our captain had a penchant for neatness so I just 'deep-sixed' questionable units. In fact, now being an analyst in a microcode project for a microcomputer firm, I proposed Meadowbrook's Motto as the team slogan, based on my naval experience; "When in doubt, throw it out!"

"Morris, I've got to hand it to you! Although your experience is orthogonal to our needs in certain respects, you ring the bell for resourcefulness! You're hired!"

Too Many Ethics Questions Unanswered

The Taylor Report

By Alan Taylor CDP

Frank Vaughan and Frank Cary have probably never met each other, but both are members of the computer community and recently both have shown they feel the need for computer ethics of some sort. Frank Vaughan is a *Computerworld* reporter, currently writing about both the large systems and the home computer area, which keeps him moving around. Problems arose for this Frank when the modern, up-to-date system of getting his money into his bank account started breaking down — not just once or twice, but regularly! CW pays Frank through the First National Bank of Boston, which forwards the funds to whatever bank he designates — in this case the Shawmut Community Bank in Newton. Since Frank is often away on payday, this is essential for smooth living.

Payment is made every two weeks, with the funds leaving CW's account in time for a Friday payment into Frank's account. It's a computerized system for everyone's convenience, but it has problems. Even though the First National takes the funds on time, Frank often doesn't receive his money until days later, sometimes not before the following Wednesday.

Repeated Overdrafts

Frank uses an interest-bearing NOW account but often runs the account down, so checks presented after the cash is supposed to be there just aren't covered. And sometimes, they have been returned for "insufficient funds."

At the base of the systems problem appears to be that NOW account, which uses a different magnetic-ink character recognition (Micr) coding than was allowed for in some parts of the system — exactly where, I don't know. NOW accounts are new — even in Massachusetts where they started — and the systems were apparently not updated to handle them reliably.

The problem that concerns Frank is the ethics of the bank's failure to notify him when the system breaks down and the funds are not transmitted properly and on time.

And to whom should he turn to find out whether that is a proper ehtical standard? This is an important question.

Frank No. 2

The other Frank is Frank T. Cary, top corporate officer of a computer firm. His position, like that of Frank Vaughan, brings him into direct contact with other people's computerized systems. A question came to his attention about the ethics of a client's use of some computer systems and whether that application "abridged human rights."

In the case in question, this Frank's company was able to answer the question to its own satisfaction.

However, I don't know what standards were applied or where to find out if any such standards even exist. This also is an important issue: Computer users really need to know where to go to get the latest information about such matters.

For instance, reading the September issue of the Braniff airline magazine last week, I found myself with a question about computer uses that inconvenience people. The article was about a computerized cash management system, which was based upon electronic transfers into a central account from local banks around the country. Funds were often available for use the same day deposits were made. So far, so good.

But then the article went on to discuss, with approval, the practice of paying Chicago accounts out of New York banks so as to continue to get the use of funds during the collection process. It also commented that "remote payment" was an essential part of any cash management system.

I started thinking about this. Clearly, it was a task suitable for computerization and well within the economic limits of today's firms.

But essentially, the application was inconveniencing some other, outside people to their financial detriment. In fact, a few steps along the way and I can see a computerized routine for kiting checks coming out of these systems and being routinely used to cover the situation automatically whenever there is a shortage of funds.

Who would tell me whether that was considered ethical if I were asked to write the routine? Currently the answer is no one. And that is where the problem lies. Someone in this profession should do so. But who?

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Correction

An added zero caused confusion in a discussion of possible realistic ceilings for damages under the Australian Trade Practices Act [Taylor Report, Sept. 19]. Going up in orders of magnitude from a $100,000 base line, the comment should have indicated that as legal costs potentially involved in fighting a computer law case could exceed either $100,000 or $1 million, then neither of these possible ceilings would protect the victim from further victimization even if he won his case.

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Letters to the Editor

To Improve, Not to Condemn

Jean A. Fowler's letter [CW, Sept. 19] on my search for operations success stories ["The Human Connection," CW, Aug. 22] deserves some comments.

Fowler's findings that my "theorem" on needs for DP human successes is "poorly developed and unsubstantiated" perhaps evolves from my choice of style and structure for the column. Exercising literary license, I purposefully gloss over dreary discussions of facts and figures, both to enshroud my engineering background and to simulate the communications of a typical human heing. That I don't write about the basis for my postulation doesn't mean it does not exist.

My idea of advertising for the "successful" center was born out of my long-endured frustration derived from listening to so many unresolved DP "people problems" for so many years. Also I had just reviewed my public discussions on the matter, which included many of my 50 CW columns (millions of exposures) and a dozen or so lectures and papers (thousands of exposures) during the last 18 months. Most distressing was my difficulty in finding anyone to disagree with my conclusion that human relations in the computer center are an unmitigated disaster.

Feeling that human communications effectiveness — and all it implies — is the heartwood of DP systems successes, I originally concocted my "theorem" and "search" as a journalistic ploy, endowed with the delicacy and subtlety of a sledgehammer to drive the point home to the readers once and for all.

Now, I believe that I'm on to a great story and I intend to follow it through, not only because it's good journalism but because, contrary to Fowler's assessment that I am "condemning them all," I love this crazy industry and hope that this story, in some small way, may make it better.

Jack Stone
Washington, D.C.

Two Do-It-Yourselfers

While it is interesting to note that Ray Carlson fills his own water pitcher ["Withington Still on Stand, IBM Trial Plods On," CW, Aug. 22], we should keep in mind that Marshall McLuhan answers his own phone.

Larry A. Welke
Carmel, Ind.

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SEE PAGE 3.

Reader Commentary

Better Stick to Your Desk

DP Education Worthless in Everyday Use

By Frank K. Binder
Special to CW

Microhours after IBM admitted to bombing out with its 600 series and announced the 1401, I enrolled in one of the very first courses at a local knowledge dispensary to learn how to clear storage by way of a slash in the op code.

Why? I still wonder — unless, like a front-runner lemming when reaching the cliff, I wanted to be one of the first ones over.

The course finished before the 1401 saw the dancing neutrons of the fluorescent overhead bulb. We ended up with our lab fee refunded after a course as intellectually stimulating and as valuable as Wagner's "Ring Cycle" played on a Berkshire dulcimer made out of sheet rock.

One of our more intelligent colleagues did the only sensible thing. He slept through the whole course, save for 10 minutes at the beginning of each class. He was from Alabama and linguistically frugal.

When asked his opinion of the instructor, he said simply: "Waahl, yuh can put a sailuh suit on a muskrat, but that doan make him a admiral."

Typical Case

As usual, it was a case of a nonpellucid instructor armed with manuals written by English majors with a minuscule smathering of ignorance about the technical entrails of the subject on hand. Thus, when debating education in America, one could devote a good many chapters to the "modus vivendi" at our centers of academe, besides the psychological, sociological and other assorted nonscientific and useless gitch in theoretical nonsense, that is indeed what is taught best.

The curse of a classical education received in Europe seldom encourages me to draw comparisons between the effectiveness of the seats of learning in Europe and America.

Any intellectual intercourse on the matter is doomed to a duumvirate of perdition. It either degenerates into a shouting match or, like milking a jellyfish, soon proves fruitless. It is sheer torture to listen to debaters who can't hang two sentences together without seven "you knows." And one must suppose that a Ph.D. in anthropology or paleantology specializing in Byzantine plinths will do that to you.

Twenty-five dollars buys you the right to wear your collar backwards, and surely we all know of a post office box somewhere willing to spit a college diploma at you for a slightly higher price.

Someday soon we'll have to apply the pyramid principle: The broader the base, the higher you can build." Give the bugger a sound base and he is teachable. Teach him to be a specialist and he spells "wrapped" as "raped" and barely distinguishes a light bulb from a plover's egg.

A valued friend of mine whose credentials literally stretch from Harvard to the moon by way of MIT sent me an interesting postcard sometime ago from California. Before he became part of the team at MIT responsible for the programs of the guidance systems for the Apollo moon shot, he tried UCLA for his master's. Two months after his enrollment came the postcard, which read in part, "UCLA is California's answer to Rindge Tech."

Out of this jumbled milieu emerges today's semiliterate twit, an instant hit in the unemployment line. Surely someone will now point to our monumental technological achievements in space. Pardon my mirth-heaving shoulders, but when Explorer I caught Sputnik in the big void, the Russian looked around carefully, then sidled over to our own and whispered, "Jetzt koennen wier Deutsch sprechen."

That our industry is making such enormous strides is due entirely to

(Continued on Poge 24)

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DP Courses Boring, Have Little Usefulness

Reader Commentary

(Continued from Poge 23)

the determination of a free spirit, the likes of which, in all my travels in strange lands, I have witnessed only in America. What a pity it all becomes a reality only outside the classroom.

Some highly regarded Soviet academicians, when first told of data processing, simply dismissed it as "capitalist witchcraft." Here, however, as soon as the permanence of our industry exploded in the skulls of the doddering dons in the ivory campus tower, the colleges dove in.

Judging from the resulting calibrated output, the quintessential lads of our industry are not the ones from these institutions. Often it's a hopeless case of "ex stercore aurem."

Meanwhile, the fringes of our industry are becoming overpopulated with a far worse scourge, the buzzword hyenas. They have created a whole new industry and are very successful at it and as qualified as a legless track coach.

Lives there a DP manager who doesn't daily get bombarded with volumes of unguided missiles propelled by his own flatulence, assuring him of his total impotence at his post? Every author of every pamphlet threatens to drag him kicking and screaming out of his mesozoic stupor and into the computer century.

Unless you read all publications compiled by these "experts" from cover to cover, you shall forever remain condemned to Pluto's Regnum without ever glimpsing Euridice.

Recently one of the many departments of something or other in Washington offered me a subscription to something I can't afford to miss. I really don't mind my government using my tax dollars to tell me I am an imbecile, but I draw the line at having to pay for it twice. The publication, you see, is not free.

Then there are also the seminars .. and special courses, without which we are supposed to be able to function in our chosen professions. Now, if somehow with the help of some miracle drug we managed to opt out of sleeping, we could read about one-tenth of all the literature projected onto our desk daily and simply keel over with either self-inflicted dyslexia or ventricular fibrillation without learning anything.

All DP professionals must daily swim against a torrential effluvium of fright tripe, spewed at us by all these self-made deii ex machinae, hell-bent on gold-lining their mattresses. Each seminar is a must, each unique, most only three days, for only $490 — room and board and transportation extra, of course.

Attend only three of such structured chaos sessions and you start wondering if perhaps the law of diminishing returns has finally invaded your cranial CPU. After all, how would you, without attending at least 17 of the seminars in two months, know that what you were presumptuously calling a master file has by the pervert geniuses been designated a data base?

And how horribly gauche of you not to call an ADD FILE a data bank. Why, if the Martians landed in your installation, they would surely wring their hands and your neck, classifying you as a member of a subspecies of a subcivilization.

So, like Xanthippe, fling the bowls of blancmange back into the faces of the would-be Socrates with a resolute "Thank you." Keep tending to your metier as you did for the past 15 years and your reports will keep coming out on time and accurately, while the self-ordained educational cretins go about inventing the wheel by another name.

Binder is director of DP at Air New England in Boston.

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'If at First You Don't Succeed . . .'

Rethinking Failures Could Lead to Success

By Miles Benson
Special to CW

The Sociology of Computing

How do you take a computing project that failed and convert it into a headlinemaking business success?

Rethink your marketing strategy.

At least, that was the answer Joe Bill Jackson found.

You may remember the story of In-Touch. Joe Bill sold Ring-a-Ding Tel and Tel on the idea of computer power in the home. The Touch-Tone phone was the vehicle for his call-up service.

Even Ring-a-Ding President Ma Bile came to the opening of a pilot version of the service in Scenic, Kansas.

But the customers stayed away in droves. And when Joe Bill finally unplugged In-Touch and left Scenic, it was an economic failure.

Philosophers say failure is the most severe test of a person's inner strengths. Well, Joe Bill was tested mightily. When his dream died, a little of the dreamer died with it.

After a mourning period, however, Joe Bill started to struggle back.

"What really went wrong?" was the question that kept reverberating through Joe Bill's brain.

As the months ticked by in Joe Bill's psychological exile, he struggled to grasp the shape and substance of the failure. He had decided to remold In-Touch and try again, but he had to understand the reasons for failure to avoid them next time.

His first major problem, Joe Bill realized, was to quit thinking as a technologist. He had a product to market to the public. The public doesn't buy technology, he now knew, the public buys service.

A small glimmer of light formed at the end of his mental tunnel. He grabbed a plane, flew back to Scenic and sifted through the archived data on In-Touch usage.

The income tax calculator service had been a solid but not outstanding performer. The desk calculator function had been a total loser — the cheapie hand-held calculator wiped him out there. Data storage had been little used.

But the automated bill-paying service? The bill-paying service had been a roaring success.

Joe Bill narrowed his thinking to the bill-paying problem. It appeared the secret to success was attracting merchants. But how could he do that? And if he was not up to that task, who could best do it for him?

Banks. The obvious answer was banks. And suddenly Joe Bill was offering a service which was not a technology toy — it was a bill-paying service.

No, it wasn't a bill-paying service. It was electronic funds transfer.

The implications were staggering — Joe Bill had been sitting at the forefront of an explosive new technology and hadn't even known he was there!

But now he knew. Visions of a new company sprang into his mind: EFT, Inc. Joe Bill began to realize his future no longer was wedded to the phone company. He could go it alone.

And that brought him right back to banks. Joe Bill made a whirlwind tour of major banks across the land. "Buy into EFT" was his message.

Well, it worked. Joe Bill lined up a consortium of a half-dozen banks from Audible Chasm, Nev., to Open Spaces, Mass., to back him. And another dozen accounts were ready to put up enough money to offer the service.

The moral of the story? It's too traditional, too predictable to even say. But it starts out with "If at first you don't succeed . . . ."

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Ecoma Comin'

HAMBURG, Germany — A series of seminars by Dr. Gary Carlson of Brigham Young University and a technical session on Amdahl Corp. measurement technology will be among the highlights of the European Computer Measurement Association (Ecoma) conference, here later this month.

The meeting is open to all interested people, the program chairman noted.

User workshops covering various types of software measurement methods, hardware monitor demonstrations and vendor presentations will also be part of the "Ecoma-4" program, which will run Oct.25-27 at the Hamburg Plaza Conference Center, according to Ecoma president Scott N. Yasler, who can be reached at the Union Bank of Switzerland, CH8021 Zurich, Switzerland.

'MAS-80' Built to Use DBMS, Runs on Mainframes or Minis

By Don Leavitt
CW Staff

BALTIMORE — Martin Marietta Data Systems, Inc. (MMDS) has introduced a rewritten, updated version of its Modular Applications System (MAS) software. MAS-80 will serve its users throughout the 1980s, MMDS said.

Like the original software, MAS-80 was designed as a modular set of systems that includes all the functions necessary for the integrated operation of a manufacturing company — inventory control, production control, engineering control, distribution/order entry, financial control and business planning.

Those six major functions are made up of 20 individually purchasable elements. Despite their "individuality," however, the elements are so fully integrated that some are prerequisites of others.

An inventory control system, for example, can range from $50,000 to $120,000 depending on the elements selected, a spokesman noted.

'New Generation'

MMDS described MAS-80 as the start of a "new generation" of software. From the beginning, the system was built around the use of a generalized data base management system (DBMS) so it could accommodate any DBMS the user chooses.

There are separate access modules for each DBMS but the linkages are so transparent to the user, according to the vendor, that MMDS was able to test its application programs in an IBM IMS environment and then run acceptance tests a "very few days later" at the first user site, which utilized Software AG's Adabas.

Family Design

"Family" is another word the vendor used in describing the design goals of MAS-80. MMDS ultimately expects to have the same logical elements available on mainframes and on minicomputers in on-line and batch processing operations.

All the modules, including the DBMS accesses, are to be written in ANS Cobol to simplify the portability, MMDS said.

First Release

Upwardly-compatible with the original MAS, MAS-II is the first MAS-80 release. It is a transaction-driven system for use under IBM OS and VS or compatible operating systems.

The system accepts transactions from local or remote terminals and updates the data base as the transactions are entered. Reports under MAS program control are generated in batch runs at night, but inquiry capabilities supported directly through the DBMS could be used to get more immediate feedback, the spokesman acknowledged.

More information about MAS-80 is available from MMDS, 300 E. Joppa Road, Baltimore, Md. 21204.

Atsu-Backed Study Shows

Financial Planners Using Networks

STAMFORD, Conn. — Fifty-eight percent of top management has a positive attitude toward the use of computerized financial planning systems, according to a survey of large corporations.

In a report published by Real Decisions Corp. (RDC), 100 users of such systems were interviewed to determine the extent and use of such automated tools. Companies represented in the survey were Fortune 1,000-sized firms plus subsidiaries and divisions of other large corporations.

Users reported activity with more than 20 different financial reporting and modeling systems currently marketed by remote computing networks. General Electric and the Service Bureau Co. were the vendors most often used by this survey group.

In addition to extensive use of remote vendors, many firms reported increasing interest in buying and installing financial systems packages on in-house equipment; in fact, RDC noted, 84% of the respondents have access to an in-house computer.

The user survey, prepared in conjunction with the Association of Time-Sharing Users (Atsu) comprises one part of a 273-page report published by RDC. Additional sections of the report present information on the financial planning packages available from 18 remote vendors.

The results of the user survey determined the selection of these vendors as well as the product features and capabilities analysis, an RDC spokesman said.

RDC, in conjunction with Atsu and other expert users, designed a set of typical financial problems which were used to develop comparative cost data for each package.

Abstracts of the report are free to Atsu members and available to others for $85 from RDC, 870 High Ridge Road, Stamford, Conn. 06905.

'Jobstream' Verifies System Changes

ATLANTA — The TDS Synthetic Jobstream from Trusco Data Systems (TDS) allows technical support and operations personnel to verify operating system and hardware changes without sacrificing production schedules, according to a spokesman.

For the technical support staff, the package can check such things as new system generations, the application of temporary fixes to the operating system and the dimensions of a problem.

System assurance tests and checkout of new or modified access methods are also handled by the software, the spokesman said.

The operations staff can use the Jobstream to verify hardware changes or to run acceptance tests of new equipment.

Since the package does not require a dedicated system, it can be used frequently to maintain high availability, reducing reruns and meeting production schedules, the spokesman noted.

Jobstream runs in one region on any OS/VS1, SVS, MVS or equivalent environment on IBM or IBM-compatible hardware. It generates its own test data and has no prerequisites in terms of IBM program products, TDS said.

TDS Synthetic Jobstream costs $800, which includes BAL source code, one printed copy of pertinent documentation (the source code tape also contains a data set that has all the documentation on it) and installation data. TDS can be reached through P.O. Drawer 4418, Atlanta, Ga. 30302.

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'OSI/Law' Eases Trial Paperwork

SANTA CLARA, Calif. — Optimum Systems, Inc. (OSI) has reportedly taken the best features of four separate remote computing services it had for attorneys and has integrated them in a single litigation support system called OSI/Law.

The system is said to be both flexible and easy to use, having been designed specifically to assist attorneys in the management of evidentiary documents, pleadings and testimony involved in a litigation.

OSI/Law provides comprehensive indexing, search, retrieval and report capabilities of material pertinent to a case —, as selected by the user/-lawyer — which is stored in abstracted form on OSI's IBM 370s but accessed from terminals in the lawyer/user's office. Literally hundreds of thousands of documents applicable may be cataloged and searched through OSI/Law, a spokesman claimed.

OSI utilizes the Telenet communication lines to move work between the user and the company's data centers, so access to OSI/Law is available over local dial-up lines in any of the 52 cities served by Telenet, he added.

OSI is headquartered at 2801 Northwestern Pkwy., Santa Clara, Calif. 95051.

QED Adds DBMS Book

WELLESLEY, Mass. — Written by Dr. Peter Chen of the MIT Sloan School of Management, a monograph entitled "Entity-Relationship Approach to Logical Design" presents an approach to data base design making data organization easier to understand and accomplish, according to the publisher, QED Information Sciences, Inc.

The "entity-relationship" approach is not restricted to the capabilities of a data base management system and is independent of storage and efficiency considerations. This means there is greater flexibility and the resulting schema is more easily understood by non-DP people, a spokesman explained.

Part of a continuing series of data base monographs, the Chen softcovered book can be purchased for $15 ($12.50 prepaid) from QED, 141 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

MSA Puts FICS On DEC Systems

ATLANTA — The Financial Information and Control System (FICS) from Management Science America, Inc. (MSA) has been adapted by the software house to run on Digital Equipment Corp. Decsystem-10s and -20s. FICS is already available for Burroughs, Honeywell Information Systems, IBM and NCR CPUs. The DEC version costs $40,000 to $50,00 from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

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Attendance by Management Function

	San Francisco	Los Angeles	Cleveland	Minn/ St. Paul	Chicago	New York	Philadelphia	Washington D.C.	Boston	Total
Corporate Officers	784	962	442	284	849	1,172	458	333	671	5,955
Systems Mgrs & Operation Mgrs	1,619	1,665	1,115	944	1,995	2,403	1,131	1,009	1,182	13,063
Programmers & Analysts	998	1,138	662	888	1,381	1,338	729	532	712	8,178
Engineering Mgt & Engineers	709	847	380	309	727	662	307	255	641	4,837
Sales & Marketing Personnel	353	371	241	215	385	592	204	187	410	2,958
Consultants/Accountants	299	293	133	115	381	576	190	151	381	2,519
Librarians/Educators/Students	209	311	192	157	207	264	127	98	121	1,686
Others	370	411	279	265	471	445	249	225	287	2,982
Total	5,341	5,998	3,444	2,977	8,398	7,452	3,395	2,790	4,385	42,178

Attendance by Industry Classification

	San Francisco	Los Angeles	Cleveland	Minn/ St. Paul	Chicago	New York	Philadelphia	Washington D.C.	Boston	Total
Computer Manufacturing or DP Hardware/Peripherals	976	1,132	486	536	658	902	249	143	823	5,905
Manufacturer (Other)	551	912	789	548	1,480	1,039	648	130	736	6,833
Serv Bur/Sftwr/Plnng/Consult	710	978	390	255	745	1,049	508	375	558	5,566
Pub Util/Comm Sys/Trans	355	244	248	217	418	599	240	137	199	2,657
Wholesale/Retail Trade	310	288	191	227	410	472	154	99	253	2,404
Finance/Insurance/Real Estate	594	578	336	266	813	1,055	482	384	344	4,850
Mining/Const/Petroleum/Ref	105	104	68	26	119	87	59	30	119	717
Business Service (Except DP)	143	141	78	57	216	271	104	47	166	1,223
Education/Medicine/Law	478	568	305	340	595	803	379	260	405	4,133
Government-Fed/State/Local	693	541	282	206	384	288	280	902	275	3,831
Prntg/Publish/Other Comm Serv	101	139	87	115	187	340	120	97	184	1,350
Others	325	375	224	184	371	547	174	186	323	2,709
Total	5,341	5,998	3,444	2,977	6,396	7,452	3,395	2,790	4,385	42,178

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☐ Gateway Computer Expo	St. Louis	April 25-27
☐ Midwestern Computer Expo	Chicago	May 2-4
☐ Mid-Atlantic Computer Expo	New York	May 9-11
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Data Flow Diagrams Ease Planning of Any Systems

By Chris Gane And Trish Sarson

Special to CW

New techniques and tools for systems analysis have been developed recently which simplify and improve the analysis phase of systems development by improving communications between computer people and nontechnical users, producing better functional specifications that save design time and by helping to make sure the right system gets built.

The underlying concept of structured analysis is the building of a logical (nonphysical) model of the current or proposed system using graphical techniques which enable the analyst and the users to "see the wood for the trees." The analyst can give the users a vivid picture of how the various parts of the system fit together to meet his requirements, and the user can give meaningful input based on the model.

Once this logical model of the system has been accepted and specified in appropriate detail by the analyst, it can be used to communicate the functional specifications to the system designer, with the advantage that the model specifies *what* the logical requirements for the system are while leaving the designer as free as possible to decide *how* they can best be physically implemented.

Building the Model

How can such a model be built?

Consider an organization whose business is selling books by mail order. People call or write and order a book; there has to be a check to see if the book ordered is available. Unless the payment for the book is sent with the order, there also has to be a check of the customer's credit.

We can show this in a logical data flow diagram (DFD) as in Figure 1. In this DFD we have used four symbols: a shaded square for sources/destinations of data; an arrow for flow; a rounded rectangle for processes that transform flows; and an open-ended rectangle for data storage.

These symbols and the concepts they stand for are at the *logical* level: a flow of data can be physically contained in a letter, an invoice, a telephone call, program-to-program linkage, via a satellite data link, anywhere data passes from one entity or process to another.

A process can physically be a roomful of clerks calculating discounts, a JCL-cataloged procedure, a program or a combination of manual and automated activities. A data store can be a rotary card file, microfiche, a filing cabinet, a table in core, a file on tape or disk or an IMS data base.

Using the four symbols enables us to draw a picture of the system without yet committing ourselves to how it will be implemented.

Of course, the system picture in Figure 1 is pretty general; in fact, it is at so high a level of abstraction that it is rather useless. Nonetheless, we can construct a picture of the system at any level of detail we choose, using only these four basic symbols.

Let us expand "Process Orders" to show the logical functions that make up the present system. For starters, we can note that the incoming orders must be checked to make sure that the details are correctly stated (that the title and author match, for example).

Further, once we have a valid order, we need to batch it together with orders for other books from the same publisher so we can get the benefit of quantity discounts.

Figure 2 shows what the data flow looks like now. We see from this DFD that, as each order is checked, it is put in some store of pending orders until (according to some logic we don't need to specify yet) a batch of orders can be assembled into a bulk order.

Filling the Orders

So far, so good. But what about filling the orders and, hopefully, getting paid for them? Each publisher will send a shipping notice with each shipment, detailing its contents; this must be compared with the order placed to make sure the right numbers of the right titles were sent to us.

Where do we find the details of the orders we placed? Clearly there must be another data store, perhaps called "Publisher Orders," that can be interrogated. Once we have the right books available, we can assemble and ship orders to each individual customer.

Figure 3 shows the system with these features added. Even at this point, no one is getting paid for anything. We need to send out invoices to our customers and handle the payments they send us.

There being no free lunch, we will in turn be billed by the publishers who supply us and will have to make payments to them.

Figure 4 shows the addition of these financial functions with their associated data stores, commonly known as accounts receivable and accounts payable.

It should be clear that Figure 4 is a general data flow diagram for any enterprise which takes in retail orders, purchases in bulk and breaks bulk, without holding inventory.

The diagram is easy for users to understand, since it does not have any of the flowchart symbols which are "visual jargon" and the terms used are in the user's language. At the same time, the logical data flow diagram serves as a precise statement of what the functions of the system are and how they are related.

Gane and Sarson are principals of Improved Systems Technologies, a New York consulting firm, and author/publishers of Structured Systems Analysis: Tools and Techniques, *from which this article was extracted.*

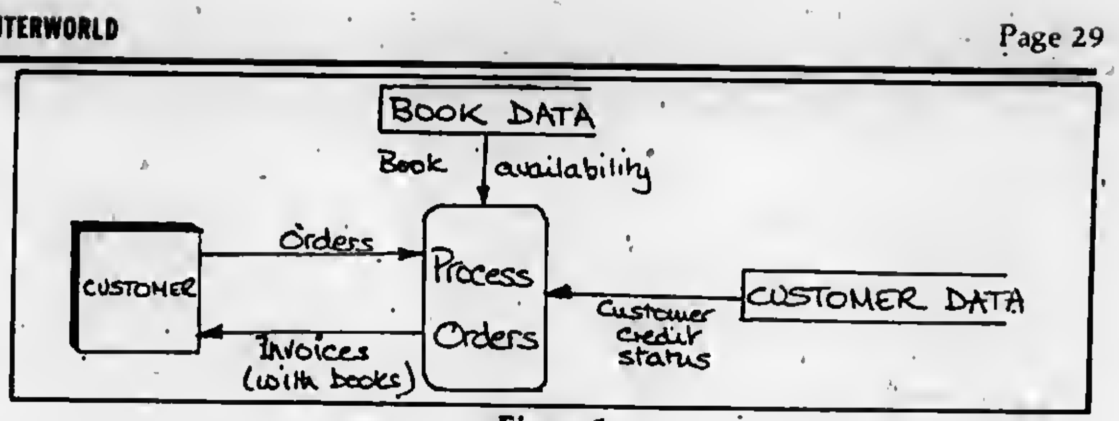

Figure 1

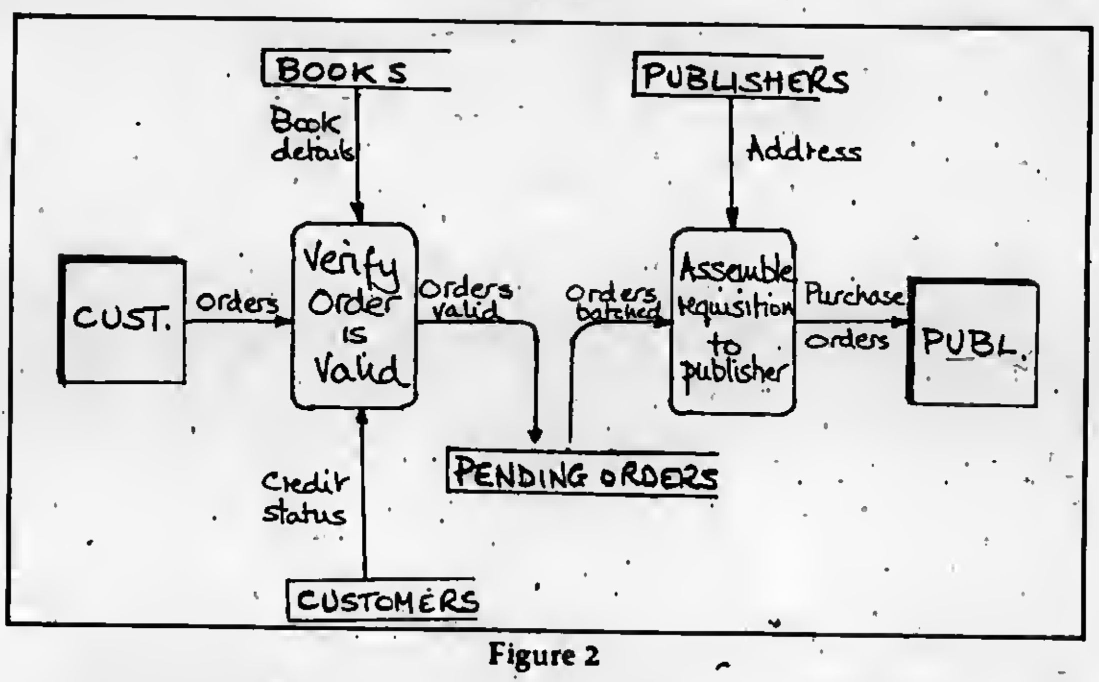

Figure 2

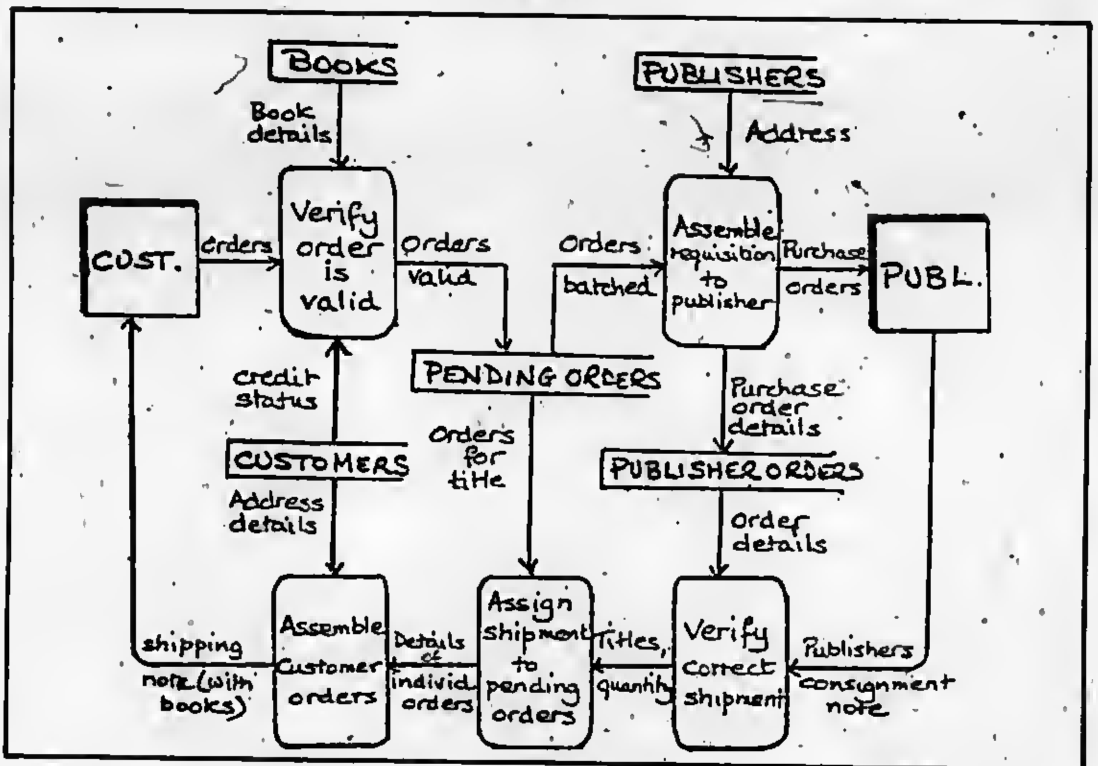

Figure 3

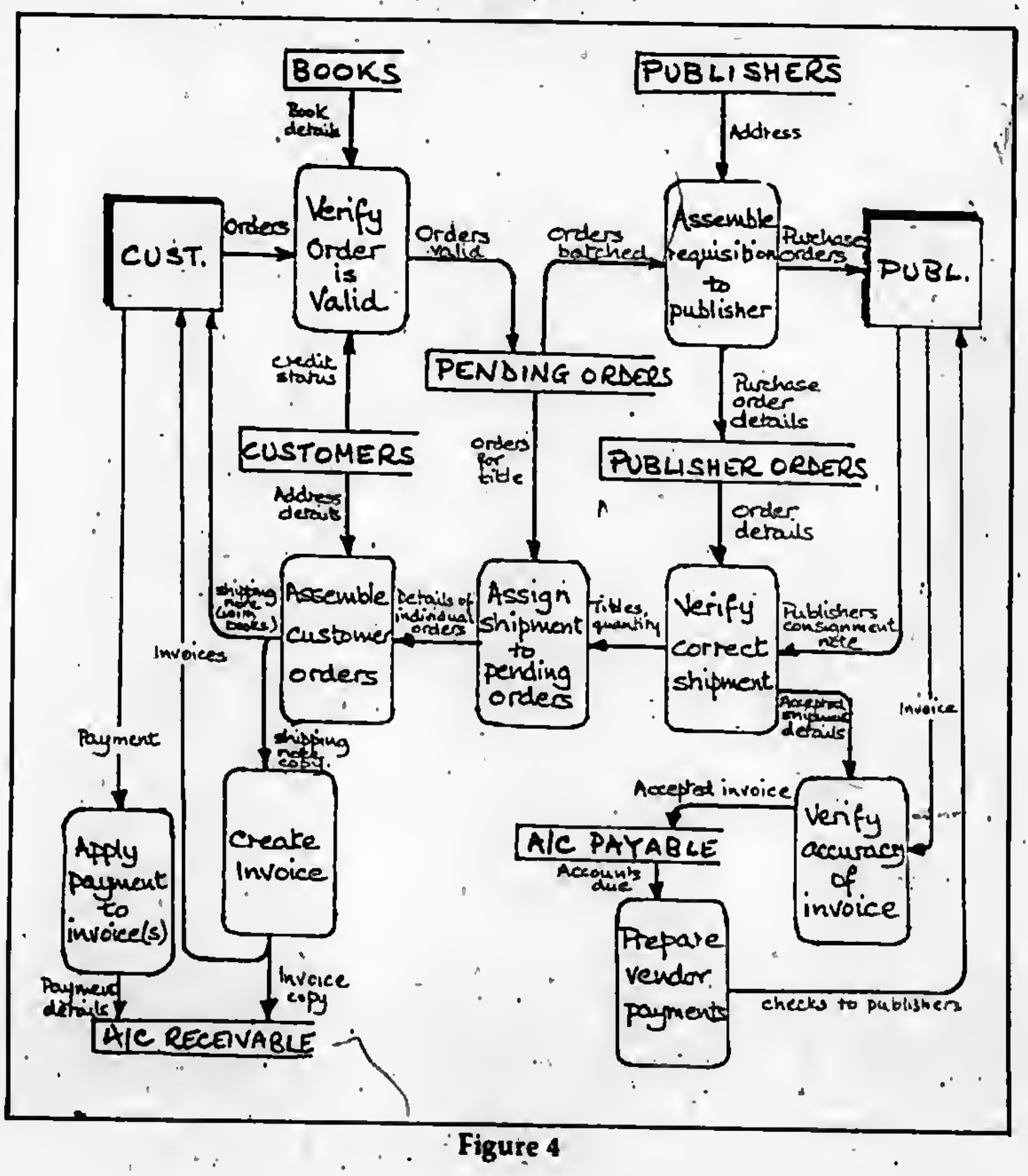

Figure 4

Publication Devoted To Documentation

CHICAGO — Sandra Paking & Associates, a group of specialists in writing for the computer community, has released the first issue of a planned management-level quarterly newsletter called "Folio."

It will be devoted to topics on or related to documentation of computer application systems.

Subscriptions to the newsletter are $25/year and can be made to "Folio," Sandra Paking & Associates, Inc., 6007 N. Sheridan St., Chicago, Ill. 60660.

3270s Get TSO Support

KINGSVILLE, Texas — A software package that reportedly allows IBM 3270 terminals to operate in full formatted mode while under the Time Sharing Option (TSO) on IBM 360/370 gear, as well as a separate-cost interface to support use of Cobol in that environment, are now available from South Texas Time Sharing, Inc. (STTS).

The TSO enhancement package itself supports use of PL/I(F), PL/I Optimizer, PL/I Checkout and Assembly language programs, a spokesman noted.

Users specify CRT display attributes in high-level terms and the STTS software produces all the text strings required to communicate with the terminal through TSO and Tcam or Vtam, he added.

Features of 3270 that are supported include protected and unprotected fields of "any reasonable length," numeric and alphabetic fields, all three light intensities, the audible alarm and the selector light pen, the spokesman said.

The basic TSO enhancement package recognizes 21 commands and will run under TSO on current releases of the MVT, SVS and MVS implementations of IBM's operating system. The package costs $4,400 while the Cobol interface (which requires the basic package) costs an additional $330.

STTS can be reached through Box 2001, Station 1, Kingsville, Texas 78363.

'Space Billing' Facility Extends SMM 'DMS/OS'

SACRAMENTO, Calif. — Available now as a separately priced optional extension of the DASD Management System (DMS/OS) from Software Module Marketing (SMM), the DASD Space Billing facility gathers accounting data through scanning of the volume tables of contents (Vtoc) at user-selected intervals.

The scanning can be based on either track or "kilobyte days," the latter unit of measure being preferable if a multiplicity of device types is involved, according to an SMM spokeswoman.

From the scans, the module generates a detail listing of data sets that can be sequenced by data set names or by user-supplied account numbers. It also prints summaries by volume serial number and device type and creates a detail record which can be processed by the installation's accounting system, SMM said.

Uses Tables

Tables are utilized for the association of volumes or volume classes with billing categories and billing categories with rates per allocation unit. The volume class is designated by a volume serial prefix of less than six characters, allowing one entry to designate all volumes possessing the common prefix, the spokeswoman said.

It is not necessary to supply DD cards for each volume to be scanned. The serial numbers of all on-line volumes are passed against the list of volume and prefixes provided as a parameter in the command which initiates the Vtoc scanning, she added.

Track Comparisons

Among the items included in the reports is a comparison of tracks allocated vs. tracks utilized.

The basic DMS/OS is available for $10,000; the DASD Space Billing "selectable unit" costs an additional $1,500, SMM said from the Crocker Bank Building Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'Alphatran' Aids Fortran Coding

CUPERTINO, Calif. — The Alphatran package from Alpha Analysis "translates" an extended version of Fortran into standard source code for that language to simplify the precompiler stages of program development and produce code that is "more readable, testable and reliable," according to a spokesman.

With the package in place, the user can work with nestable control block structures such as WHEN ...THEN ... ELSE. In addition, a generalized DO loop permits backward-running, negative, real and double-precision control variables, he claimed.

'Control Words'

Beyond that, "control words" that permit more efficient and understandable code than is possible under "standard" block structures are also part of Alphatran, he said.

"Internal procedures" supporting names with up to 63 characters are among the other features. These permit and encourage the development of self-documenting code by top-down, structured techniques, the spokesman said.

Free Format

Alphatran allows programmers to prepare source statements in free format. As part of its output, the package produces an indented source statement listing, he added.

The software can be used on any mainframe that supports Fortran and has been designed so it can be used on many minicomputers as well. It costs $795 and can be ordered from Alpha through P.O. Box 1572, Cupertino, Calif. 95014.

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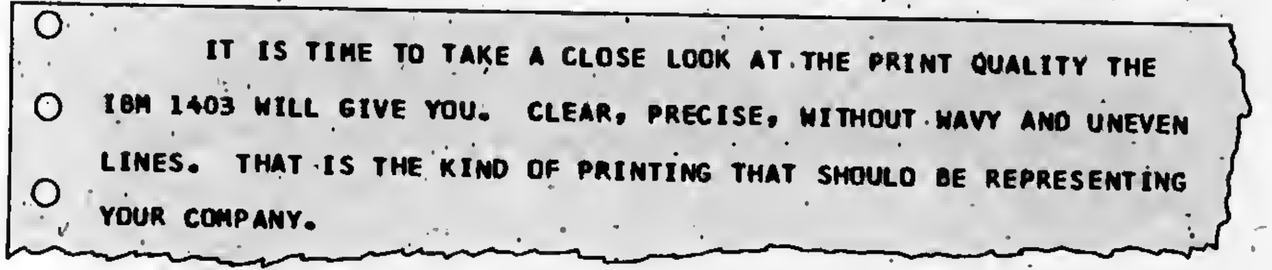

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Many Products Feature Micros

Adapters for IBM 3600 Among Debuts

By Ronald A. Frank
CW Staff

SAN DIEGO — A variety of telecommunications products, many of them microprocessor-enhanced, were shown at the annual conference of the Tele-Communications Association (TCA) here recently.

Racal/Milgo (formerly International Communications Corp.) of Miami and Intertel, Inc. of Burlington, Mass., exhibited adapters that will allow users of the IBM 3600 series terminals to utilize standard modems.

The terminals use an interface with Synchronous Data Link Control (SDLC) loop configurations that include a phone jack. The adapters convert the phone jack interface to EIA RS-232 connector pins so conventional modems can be attached.

The adapters provide users with the ability to perform diagnostic tests on the terminals connected to the SDLC loops. This is done by bypassing the 3601 terminal controller to directly access units connected in the loop configuration.

The Racal/Milgo unit is called the 36 LA and can operate at 1,200- or 2,400 bit/sec depending on the Milgo modem used. The 36 LA costs "under $600," according to a spokesman.

Compatibility is currently limited to the 3600 finance system, but the device can also operate with the retail and supermarket systems, the spokesman said.

Intertel, Inc. showed its EI 200 adapter, which has already operated with all three IBM 3600 systems, according to a spokesman. Ther Intertel unit costs $402 or $12/mo on a two-year lease.

Two Modems

General Datacomm Industries, Inc. of Wilton, Conn., introduced a full-duplex 1,200 bit/sec modem designed for dial up applications. Called the 212A, the data set is compatible with the Bell 103 and 212A modems and can operate in asynchronous mode at 300 bit/sec or synchronous mode at 1,200 bit/sec.

The GDC 212A has both local and remote diagnostic capabilities in addition to auto speed recognition. It costs $795 and is scheduled for delivery in the first quarter of 1978.

General DataComm also showed the LDM-1 limited-distance modem that can handle data rates ranging from 1,800 bit/sec to 19.2 kbit/sec. The unit can operate over two-wire and four-wire facilities in either half-duplex or full-duplex mode and costs $795.

Sidereal Corp. came from Portland, Ore., to introduce its Micronet II system, which allows users to access Telex, TWX and dial-up facilities with the same terminal.

The Micronet II uses a Digital Equipment Corp. Decwriter or LA 120 teleprinter with a buffer based on a Motorola microprocessor unit. The buffer has a storage capacity ranging up to 48K and allows the user to eliminate the paper tape required with teletypewriters, Sidereal said.

CW at TCA

Micronet II features include automatic refile, an address directory of up to 250 "commonly called numbers," diagnostics, unattended transmission and multiple addressing, a spokesman noted. It costs $7,000 to $10,000 depending on configuration.

Infoswitch Enhanced

Datapoint Corp. added several computer-controlled features to its Infoswitch telephone cost-control system. They include a long distance control system a station message detail recorder and automatic call distributor (ACD) capabilities.

The Infoswitch system was designed to provide users with detailed data on phone usage and provide specific printouts on call patterns according to station number.

American Satellite Corp. used a dedicated earth station made by Fairchild and set up outside the conference hall to demonstrate a simultaneous transmission of digitized voice and high-speed data plus facsimile over a 56 kbit/sec link.

Digitech Industries, Inc. of Ridgefield, Conn., showed an enhancement of its Pacer line monitor that allows users to test the maintenance routines built into the Bell Dataspeed 40 Model 4 CRT terminal. The added "List-B1" features include a double expanded compiler which uses a high-order machine language, seven programmable read-only memory sockets for the Dataspeed 40/4 and a test program.

The Dataspeed features add $1,095 to the cost of a basic Pacer test system. The features can be added to existing units at the factory. The full Pacer line monitor costs $15,230, including a CRT.

Port-Sharing Unit

Teleprocessing Products of Los Angeles introduced its Model TP-12 port-sharing unit that connects two separate central site modems to one computer port. The modems, which can operate in either multipoint or point-to-point nets, costs $540.

Racal/Milgo also showed an intelligent clustered programmable terminal system that was described as an engineering prototype. Called the XP-4, the system includes a controller with three Intel 8080 MPUs.

Introduction of the terminal system has not yet been set, but depended in part on user reaction at the TCA conference, a spokesman said.

Bell Adds Multiplexer System, Hints at Dataphone Upgrades

SAN DIEGO — The Bell System showed one new product and talked about another at the annual Tele-Communications Association (TCA) conference here recently.

A multiplexer system designed to operate on private lines was introduced. Called the Dataphone Data Multiplexer, the system can handle 16 asynchronous lines at speeds up to 1,200 bit/sec between a terminal and the multiplexer, according to a spokesman.

Between multiplexer units, the system operates in synchronous mode at 2,400-, 4,800- or 9,600 bit/sec. Up to three circuits can be supported at remote sites, providing for a maximum system configuration of one master station multiplexer and three remote multiplexers, the spokesman said.

A master station at the DP site includes a multiplexer and a line control unit, the Model 1800A, which selects speed and performs diagnostics. This configuration has a proposed cost of $365/mo under an intrastate tariff application filed recently with the California Public Utilities Commission.

A remote configuration includes only the multiplexer, designated the 1200A, and can be located either at a user or phone company site. The remote unit costs $170/mo at the user's location and $175/mo at the phone company central office.

A possible restructuring of Dataphone rates was mentioned in a speech by Gordon Hough, board chairman of Pacific Telephone and Telegraph Co. Users who now have Dataphone service on a seven-day basis could get usage-sensitive pricing.

"We will be offering improvements in switching that will make it possible to use transmission circuits at the times users find most convenient. And users will be charged only for the times of transmission," Hough told the conference attendees.

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Manager Awareness Urged

Financial Goals Seen Vital to Equipment Choice

By Ronald A. Frank
CW Staff

SAN DIEGO — Telecommunications managers should be aware of the financial goals of their company when evaluating vendor equipment. This was the consensus of opinion of a user panel at the recent Tele-Communications Association (TCA) conference.

The telecommunications manager is only part of the total corporate picture, according to Donna Parker of Envirotech Corp., and therefore the acquisition of communications equipment should fit in with the financial policies of the firm.

When a purchase vs. lease decision is under consideration, the telecommunications manager should determine whether the type of equipment is covered by existing company insurance, according to Alexander Guba, who is on the telecommunications staff at Allstate Insurance.

Parker said most managers who handle communications are too timid to check into where their responsibilities lie in the corporation. The acquisition of up to $10,000 worth of equipment is usually not too much of a problem, but beyond that figure, the manager must consider where liabilities lie if things should go wrong.

Maintenance

Erle Whitney of Bunker Ramo Corp. told attendees that a contract for communications equipment should ideally contain a guarantee that there will be no hike in maintenance costs. If this is not possible, allowable increases should be clearly spelled out, the panel agreed. The vendor's warranty as to what can be supported and replaced without charge should also be clearly delineated, they said.

Critical Clause

A critical clause in a contract for communications equipment specifies that the devices cannot be assigned to a third party without the permission of the user, Parker said. This condition arises if the vendor should go out of business or otherwise make a financial arrangement with a third paty. If the "no-assignment" clause is put into the contract, then the user must be notified, she told the attendees.

Software

A TCA member in the audience said there was a similar risk when users acquire equipment which requires proprietary software. In one case, a vendor was required to place software documentation crucial to the reprogramming of a communications device in escrow with a local bank. Under a contract, this user would get access to the software if the vendor was not able to provide the necessary support, the member said.

CW
At TCA

In House

The panelists agreed the best protection for the user would be to develop in-house maintenance and software capabilities.

With the required level of in-house expertise, the user is less vulnerable to services that are later not fulfilled by the equipment supplier.

Whenever communications equipment is being evaluated, the telecommunications manager should consult with financial, legal, engineering and research departments, he said.

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System Helps Las Vegas Police Beat the Odds

Special to CW

LAS VEGAS — A computer-based datacommunications system that gives patrolling police officers instant access to local, state and federal crime files is making it harder for visiting bad guys to beat the odds here.

Built by Kustom Data Communications of Chanute, Kan., the system provides a means of dispatching police vehicles and transmitting information on stolen cards, outstanding warrants and missing persons to officers on patrol.

The system is comprised of a Digital Equipment Corp. PDP-11/45 minicomputer with 64K words of core memory, two DEC TU10 magnetic tape drives and three RKO5 cartridge disk subsystems. The system supports full-duplex communications between the computer and up to 75 plasma display terminals mounted in police patrol cars.

Kustom provided a packaged software system developed specifically for law-enforcement computer-aided communications.

Among its benefits, the computer-based system enables supervisory personnel to monitor patrol personnel because it provides a record of how long it took each officer to respond to an incident and how long he was at the scene.

More importantly, however, computer-aided dispatch frees voice channels for pursuit and emergency purposes.

Because transmission speed over the UHF channel is 1,300 bit/sec, each message is on the channel for a fraction of a second - far less time than it would require to transmit the message by voice.

In addition to speeding up the dispatching of police vehicles, the city's computer-controlled communications system gives patrolling officers instant access to a number of crime files, including the National Crime Information Center (NCIC).

Under Stress

Las Vegas imposes unique stresses on police communication networks. The city plays host to large numbers of short-term visitors — as many as 11 million per year, or 50,000 per day in a city with a permanent population of only 275,000 people.

Coincidental with this large number of visitors has come an increasing incidence of crime, and as a result, the city now has the second highest crime rate in the country.

To maintain order in the city, the Clark County Sheriff's Office (the Las Vegas Police Department and the sheriff's office were merged in 1973) has 713 officers and keeps 35 to 70 vehicles on patrol, with an average of 45.

This number of patrol units, combined with a rising number of incidents, however, had clogged conventional voice communications channels so much that response times to dispatchers' instructions were seriously affected. Delays ranging from five to 30 minutes in handling an officer's inquiry were not uncommon.

With the PDP-11/45-based data communications system, however, Las Vegas police dispatchers are handling 50% more than the previous system allowed with no increase in personnel and response times to an officer's query have been cut to an average of 20 seconds.

The PDP-11/45's control over the highly efficient dispatching system that handles the movements of Las Vegas police vehicles starts when a call comes in to one of the six complaint consoles located in the communications center.

The console operator first keys the incident into a Kustom CRT terminal using a mask generated by the PDP-11/45 to aid in questioning the caller.

The operator fills in the blanks on the screen following each question — address of the

(Continued on Page 36)

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System Boosts Police Odds

(Continued from Page 35)

complaintant, nature of the call, etc.

As soon as the operator keys in the address, the PDP-11/45 feeds the information to an IBM 370/145 database system to perform address verification.

The 370 supplies the zone, the district and the grid of the address back to the PDP-11/45 dispatch computer.

If the address is invalid, the operator is informed on her CRT screen within three seconds, enabling a query of the caller further while he or she is still on the telephone.

Transfer to Dispatch

When the complaint operator has keyed in all the required information, it is transferred to the dispatch console responsible for the region in which the incident was reported.

The dispatcher then reviews each event, selects the vehicles to be assigned and transmits the event directly to the unit through a high-speed digital radio transmission link.

When the police vehicle receives the data, acknowledgement is automatically sent back to the dispatcher and is displayed on the CRT screen.

At the Scene

When a patrolling officer arrives at the scene, he keys in his arrival. The dispatch computer displays the new status of the arriving vehicle on the dispatcher's CRT screen and logs the time. When the officer finishes the call, he enters a disposition code.

The system also logs all events over a 24-hour interval on one of the disk systems.

The two TU10 tape systems log every transaction occurring on the dispatch system. Tapes are replaced every 24 hours and are entered into the database computer for long-term storage and analysis.

Police vehicles have keyboard and 242-character display for communications between officers and the data base. Response time averages 30 seconds.

Device Allows Port Sharing

CHATSWORTH, Calif. — Micom Systems, Inc. has unveiled an intelligent, microcomputer-controlled port-sharing device.

The Micom 603 transaction concentrator permits four terminals to be connected to one computer port, either directly or via modems, according to Micom.

The 603 is buffered and lets terminals of different speeds transmit to a single computer port, it said.

The four terminals connected to the concentrator interact with the computer as if they were directly connected to the port. Reportedly, any terminal can input an inquiry message at any time.

If the port is in use by another terminal, the message wil be stored and placed in a queue and delivered on a first-come, first-served basis as the computer port becomes available, with the computer port being "switched through" to the terminal for the duration of the response message from the computer, the company explained.

The 603 is designed for use in a simple transaction processing environment where a number of data terminals operating in inquiry/response mode are connected to a central computer.

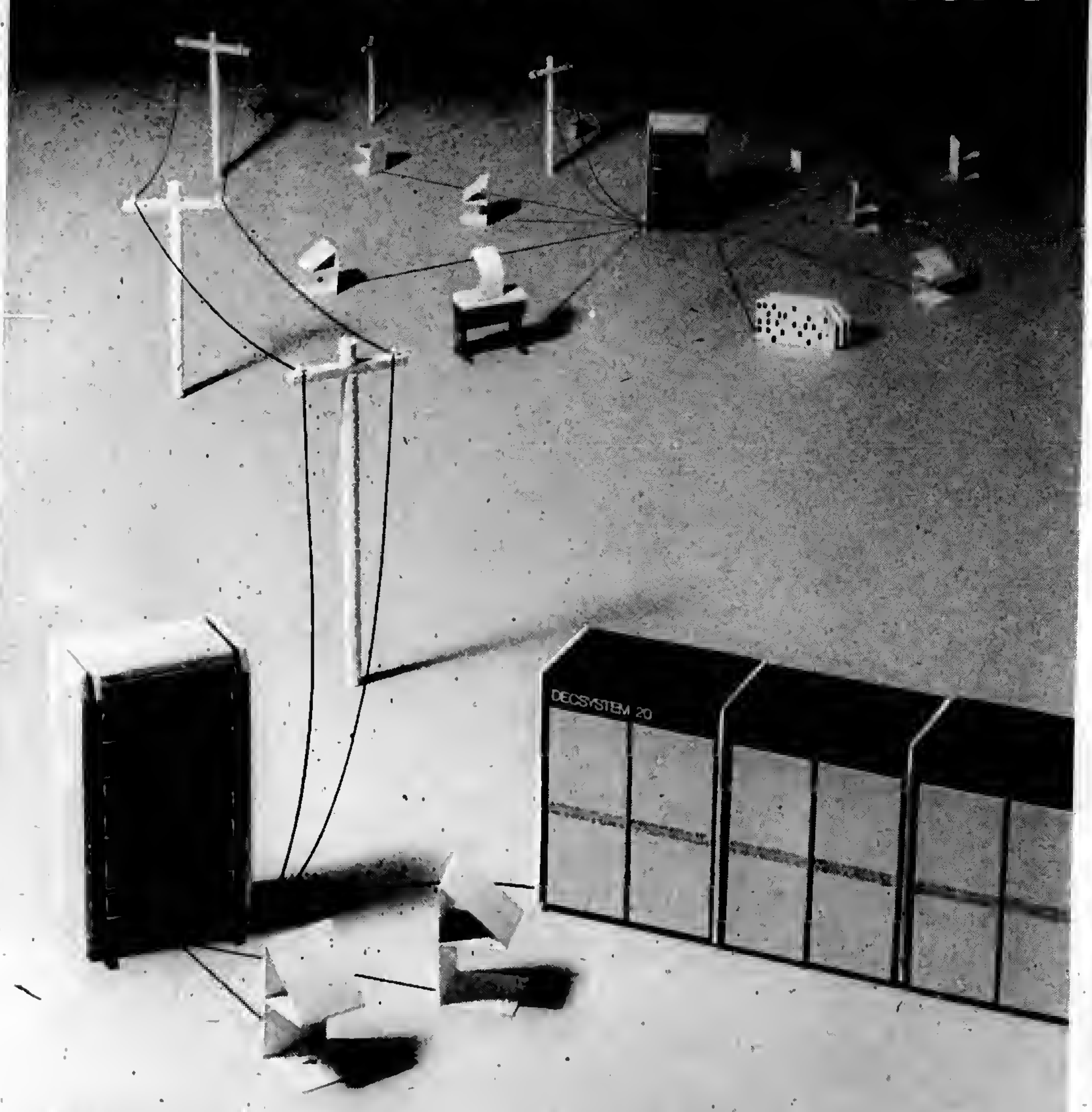
The terminals are typically Teletypes or Teletype-compatible.

The concentrator can handle asynchronous transmission speeds from 50- to 2,400 bit/sec in Ascii.

The 603 comes with an RS-232C serial asynchronous interface. Integral modem modules compatible with Bell 103 and 202 modems are available for custom configurations.

The 603 is priced at $2,000, a spokesman noted from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Smart/Mux Solution Number 1



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Wescon Speaker Predicts

Memory Innovation in Store for Users

By Toni Wiseman
CW Staff

SAN FRANCISCO — While some signs of maturity in the field of semiconductor memory are becoming discernable — particularly in the areas of design quality and product reliability — the pace of innovation seems little diminished, according to a speaker at the recent Western Electronic Show and Convention (Wescon '77) here.

A host of recently announced or soon to be introduced products provides the user with a new generation of devices with superior characteristics for a wide spectrum of applications, Dr. Paul Schroeder of Mostek Corp., said.

N-channel metal oxide semiconductor (NMOS) memory "continues to be the dominant technology in semiconductor memory, with more advanced forms moving into both higher speed applications previously served only by bipolar and into some very low power areas" that until now were exclusively the domain of complimentary metal oxide semicoductor (CMOS)— memory, Schroeder said.

The overwhelming proportion of mainframe and general-purpose devices use NMOS silicon gate or some variant, such as two-level poly, he noted.

"High-performance versions, which employ shallow (preferably implanted) source drain regions and scaled device dimensions, are beginning to appear which may significantly challenge bipolar in the very high speed (in excess of 50 nsec access) range, although the fastest speeds are still the exclusive preserve of bipolar devices," he stated.

"At the opposite end of the spectrum," he noted, "extremely low-power static memories have been introduced which employ NMOS silicon gate augmented with high impedance poly resistors.

"Memory cells implemented in this technology have standby currents comparable to CMOS while retaining the cost and speed advantages of the simpler NMOS process.

"Because of these advantages, it is likely this form of NMOS will largely displace CMOS in the low power/batery back up [random-access memory (RAM)] market," Schroeder said.

Despite the overriding presence of NMOS in the field, other technologies, especially integrated injection logic, are being used to achieve cell areas comparable to those in MOS, he noted.

"Dynamic concepts, previously an MOS exclusive, are now being introduced to bipolar," Schroeder said. If these efforts are successful, the cost and density of MOS could be reduced.

However, the gap is sufficiently great that it is unlikely that a major technology shift to bipolar will occur for main memory applications in the near future, he noted.

Schroeder noted that several product areas are showing growing interest — 4K static RAMs, for instance. Two main lines of development have emerged, one aimed at speed and the other at power, he said.

In the high-speed area, sub-50 nsec access time is the universal goal and both MOS and bipolar devices are or will soon be available, he told his audience.

At the other end of the spectrum, devices with 200 nsec acess times have been introduced that provide dramatic power reductions over previous NMOS statics, he said. The successful implementation of a static cell which employs near-intrinsic polysilicon load resistors and the application of dynamic curcuit techniques to the peripheral circtuitry are responsible for this advance, he pointed out.

Most of the controversy that has accompanied dynamic RAM progress has died down, at least temporarily, with industry consensus on a single 16K (as well as 4K) multiplexed specification, he stated.

Schroeder wondered whether a large call for charge-coupled devices, which have reached the 64K density level, may have to wait for smaller cells, substantially faster operation, less expensive fabrication or higher density to make the economics of the technology more attractive.

Bits & Pieces

Seminar on Microfilm Set To Debut in New York

NEW YORK — The American Management Associations will be holding its "Microfilm in Records Management" seminar here Nov. 14-16.

The course agenda includes such topics as "System Considerations of Microfilm in Records Management," "Quality Controls in Micrographics," "Indexing Microfilm," "Technology of Micrographics," "Legality of Microfilm," "The Microfilm System" and "Computer Output Microfilm [COM] in Records Management."

The course instructor will be Robert F. Williams, president of Cohasset Associates, Inc. of Chicago.

The seminar will also be held Dec. 14-16 in Atlanta and Jan. 11-13 in Chicago.

Registration fees are $480 for non members and $420 for members; team discounts are available.

Registrations can be made by contacting the organization at 135 W. 50th St., New York, N.Y. 10020.

Kit Backs Output Design

NEW YORK — A device to assist users in the design of hard-copy output has been introduced by Magic Chart, Inc.

The Magic Chart Kit consists of a transparent mylar polyester chart plus marking pen, pencil and eraser. The chart can be placed over printouts to determine alignment and spacing; printouts can also be designed on the chart surface.

The kits are available in both 6- and 8 line/in. format and cost $25 each. Quantity discounts are available.

Custom charts can also be ordered, the firm noted from 25 Broad St., New York, N.Y. 10004.

VCI Plans Seminars

CHERRY HILL, N.J. — Value Computing, Inc. (VCI) will hold four seminars on production control in computer operations environments.

The seminars are scheduled for Oct. 27 at the Hyatt Regency in Atlanta, Nov. 11 at the Hyatt Regency in Chicago, Nov. 23 at the Marriott Motor Inn in Newton, Mass., and Dec. 13 at the Indianapolis Hilton in Indianapolis.

There is no charge for the seminars. Interested persons should contact VCI at 300 VCI Building, W. Marlton Pike, Cherry Hill, N.J. 08002.

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Shrewd Deals Help Blue Cross Save $800,000

By Philip H. Funk Jr.
Special to CW

At New Hampshire-Vermont Blue Cross and Blue Shield, tight DP budgets are the normal method of conducting business. As a nonprofit service organization, we have an obligation to subscribers to control administrative claims processing costs as tightly as possible, while providing high-quality service.

Since DP operations account for approximately 15% of the corporate budget, stretching the DP dollar has considerable effect on overall administrative costs. Dollar stretching has enabled us to reduce the DP cost per processed claim from 52.1 cents in 1974 to the current level of 43.4 cents, a reduction of 17% during an inflationary period. This cost reduction represents a savings of over $800,000 since 1974 and was accomplished without sacrificing performance or quality, both of which have improved.

Cost reduction methods employed are separated into four main areas: hardware, supplies, software and personnel.

Hardware Savings

Dollar stretching in the hardware area requires managing the growth of the DP installation, resisting the temptation to install the newest equipment and selecting the most favorable financial terms for selected equipment. Financial alternatives considered included long-term leases from the vendor, third-party leases and purchase.

Each of these alternatives has been employed at Blue Cross and Blue Shield at one time or another, although no equipment is currently on lease from a third party.

Managing the growth of the installation is essential in order to take advantage of long-term financial arrangements. Our 500K-byte IBM 370/145 has been installed since December 1973 under the IBM Term Lease Plan. This has enabled us to hold our CPU costs constant for the past four years. The last time our CPU costs were lower than the current level was in mid-1971.

Although the system has been running consistently at 85% utilization for the past two years, software changes have enabled us to meet increasing workload demands. These changes are discussed later in this article.

Installed peripherals include two IBM 3211 printers, 10 IBM 3420-3 tape drives and 24 Control Data Corp. 33301 disk storage units. Both the printers and disks are on long-term leases from the manufacturer. Purchase and lease-back alternatives are being investigated for the printers to see if more favorable terms can be found.

The tapes were purchased in November 1976. Disks will be upgraded to CDC 33302-11 disks next March and April. In all of our lease or purchase decisions, factors such as the cost of money, projected maintenance increases, useful life of the equipment and accrued purchase credits are considered.

Also installed are 42 local CRTs (IBM 3277) and five remote CRTs (IBM 3275). Since users projected a long-term demand for use of the applications supported by these CRTs, financial analysis indicated that purchase was the best alternative.

For data entry, we use two Mohawk Data Sciences 2400 key display systems with 37 keystations. In this particular area, we took advantage of terms in our lease agreement to extend the lease to a total term of seven years, thereby saving more than $52,000 over the contract term.

Printing Changes

Acquisition of consumable supplies is another area that has produced major savings. Early in 1975, we made several

(Continued on Page 39)

Hard copy made easy.

With the help of a high-speed microprocessor, Hewlett-Packard combines exceptional performance and convenience in a new low-cost printer and printing terminal.

The HP 2631A printer and HP 2635A printing terminal with alphanumeric keyboard are the first members of a new Hewlett-Packard family of hard copy terminals.

Each machine was designed to give you a number of high-performance features. And both can support a variety of interfaces, including RS232 and CCITT V24, to fit into systems made by HP and other manufacturers.

Bi-directional printing increases throughput. Both printers zip along at 180 cps in both directions, depending on your line layout. The microprocessor chooses the quickest path, and increases the speed even more by suppressing leading and trailing blanks.

High-speed slew for columnar data. When the microprocessor senses more than ten blanks in a row, it slews the print head at 45 inches per second to the next print position.

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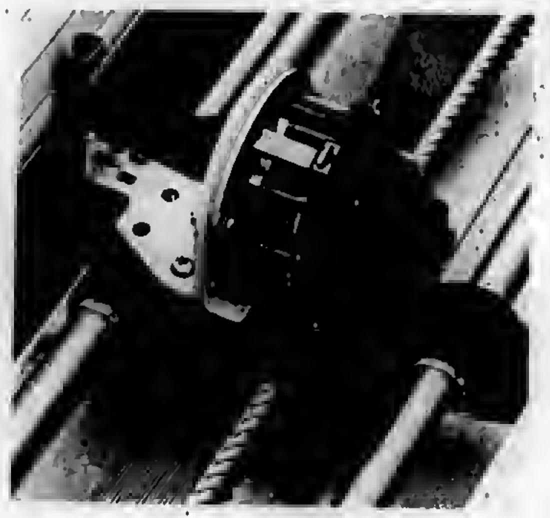
Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow true underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.

Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a stand-alone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

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File Keeps Tape Safe From Fire

BLUE BELL, Pa. — Univac has introduced a tape file that reportedly provides fire protection for stored magnetic media.

The Victor Fire Master is a three-drawer file which has successfully passed the Underwriter Laboratory's fire endurance test and explosion test.

The unit sells for $1,892 from the firm at P.O. Box 500, Blue Bell, Pa. 19422.

Blue Cross Cuts DP Costs $800,000

(Continued from Page 38)

changes in our use of standard stock paper. We switched from standard wide list stock and printing at six line/in. to stock paper designed for printing at eight line/in., thereby achieving approximately a 25% savings.

At the same time, the installation of two 3211 printers (replacing three 1403s) allowed us to switch from expensive multipart paper to printing multiple copies. The 1975 savings realized by these changes was over $1,200/mo. A third change was a switch to a less expensive grade of paper, which further reduced the cost of consumable supplies.

Ribbon reinking has also proved to be a valuable tool. With the cost of new ribbons more than double the cost of reinking, we have been able to decrease our ribbon costs by over 30% through this method.

Savings in all the above areas have been increased through competitive bidding. On most large orders, we are able to select from several vendors to obtain the price and quality that best suits our needs. Competitive bidding on magnetic tapes, for example, has saved us approximately $1.50 per reel of tape.

Savings accruing from software are perhaps harder to quantify in terms of dollars. However, the installation of packages such as the Total data base management system (Cincom Systems); CA-Sort-II, a fast sort merge (Computer Associates, Inc.); Fats tape certification program (Innovation Data Processing); and the Westinghouse Dump/Restore program have enabled us to extend the useful life of installed hardware.

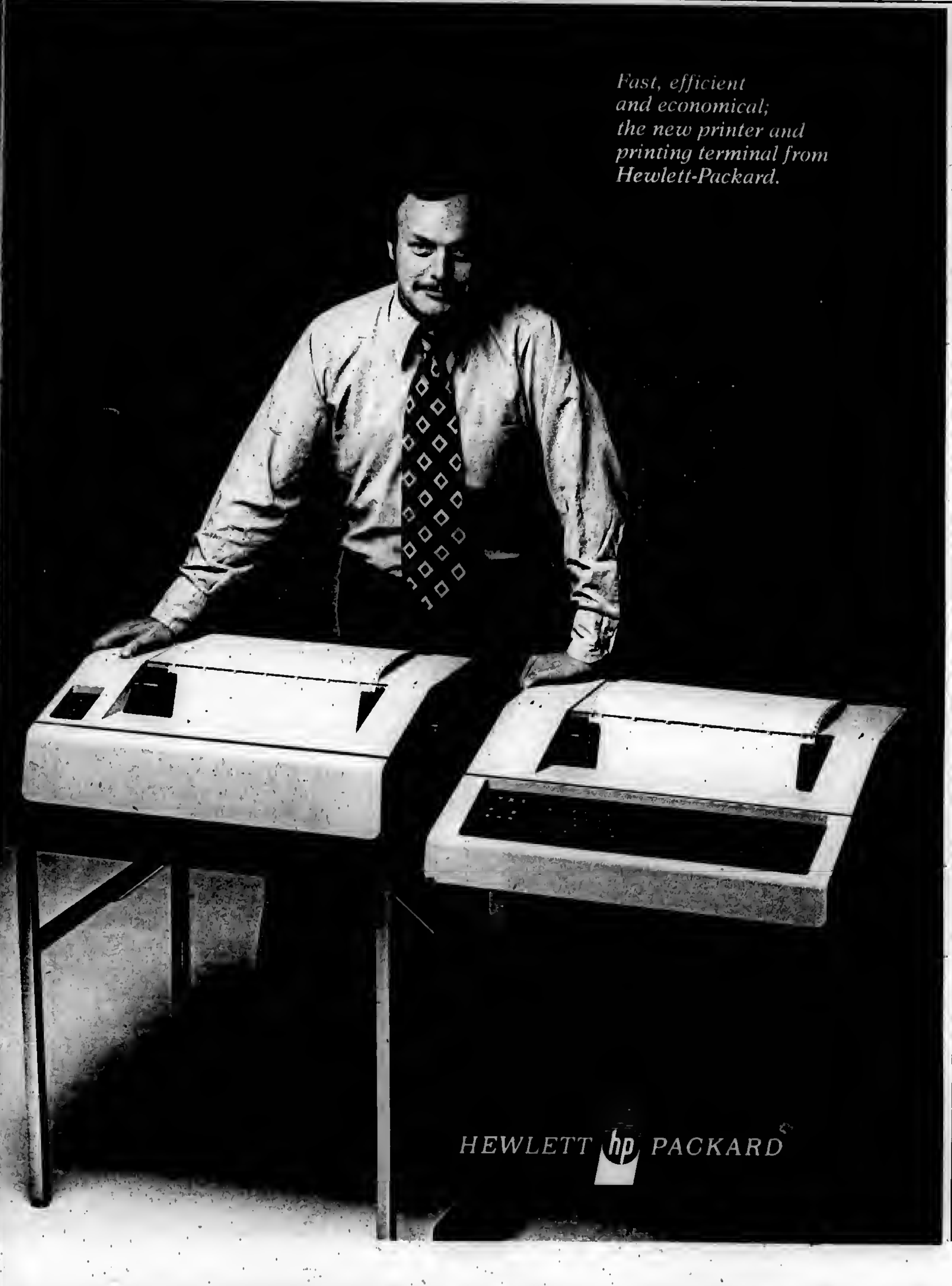
Improvements to our applications software have also shown substantial reductions in run times. Our teleprocessing executive, based on Btam, permits multitasking of teleprocessing and provides an average response time of less than two seconds. The Epat tape library system (Software Design, Inc.) resulted in direct savings because its installation permitted removal of two tape drives and a reduction in periods of maintenance coverage.

Although our workload has been increasing at an annual rate of about 10%, we have reduced our work force by about 5% in the last three years and eliminated over 75% of overtime. Employee turnover has been reduced as a result of better training and motivation.

Our computer operations work schedule, which combines three 12-hour work days with alternating coverage on Sundays, provides for 24-hour, seven-day operations without overtime. A data entry incentive program [CW, June 28, 1976] has resulted in a 30% increase in operator productivity.

In addition to the dollar stretching techniques discussed above, improved understanding on the part of DP employees of the goals and objectives of the department and how they relate to corporate goals has enabled us to process an increasing workload with improved performance without corresponding increases in cost. In fact, our 1977 operating budget of slightly over $2 million is about $125,000 less than the 1975 budget.

Funk is the director of computer services at New Hampshire-Vermont Blue Cross and Blue Shield.



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Printer Based on Micro

NASHUA, N.H. — A microcomputer-based intelligent printing system reportedly able to generate variable-sized characters without requiring additional programming of the host CPU has been introduced by Dataroyal, Inc.

The IPS-7200 can function as a label printer, general-purpose output printer or as an application-programmable printer. The unit's 8080A microprocessor unit can be accessed through preprogrammed read-only memory chips that can be custom-programmed by Dataroyal, according to a spokesman.

The printer operates at 120 char./sec bidirectionally with up to 132 char./line. Line spacing is 6 line/in. with 10 char./in horizontal spacing.

Characters generated are 5 by 7 dot matrix and the character set is 64 Ascii characters and two special characters, the spokesman said.

Available Interfaces

RS-232 or current loop interfaces are available. The double-buffered unit can transmit at 1,200 bit/sec in IBM 2848, 2260, 1053 or teletypwriter-compatible protocols, Dataroyal said.

The IPS-7200 can expand its Ascii character set in 1/9 in. increments from 1/9 in. to more than 10 in. high, the spokesman claimed.

The printer sells for $3,950; OEM pricing is also available from the firm at 235 Main Dunstable Road, Nashua, N.H. 03060.

From Univac

Filer Holds Various Media

BLUE BELL, Penn. — An automated storage and retrieval system that can be configured to store magnetic tape reels, microfilm and punch cards as well as standard files is available from Univac.

The Lektriever 100 is available in 8-, 9- and 10-ft heights and occupies 34 sq ft of floor space. The maximum number of carriers in any unit is determined by storage media size requirements and the height selected.

Shelf Configuration

In the shelf filing configuration, the unit provides 1,234- to 1,586 file in. of lateral files. Two shelf pitches, one 11 in. and one 13 in., serve all standard media sizes, a spokesman said.

In the tray filing configuration, up to 8,352 filing in. representing more than 800,000 cards are provided. In the T-bar configuration, 880- to 1,234 filing in. are available, enough for several hundred magnetic tape reels, the spokesman said.

Prices of typical systems range from $6,400 for the 8-ft model to $6,700 for the 10-ft model. Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19422.

Two Terminals Aid Data Entry

SUNNYVALE, Calif. — Two data terminals for industrial applications have been introduced by Data Pathing, Inc. The units are compatible with current Data Pathing equipment including other terminals, controllers and minicomputers as well as software, a spokesman noted.

The modular Intelligent Terminal (MIT) 134 includes a CRT and keyboard and features four screen-size formats and either normal or double-size characters.

The MIT 134 was designed for use in offices and supplements the previously announced MIT 133, which is used primarily in factory environments, according to the spokesman.

Two Versions

The Model 102 attendance terminal is available in two versions, each accommodating a different type of badge. Both units provide a four-digit clock display. The 102 has three programmable keys as an option that can be used for recording additional information.

The MIT 134 sells for $2,800 and rents for $58/mo on a five-year plan. The 102 sells for $1,900 and rents for $36/mo under the five-year plan. Data Pathing is at 370 San Aleso Ave., Sunnyvale, Calif. 94086.

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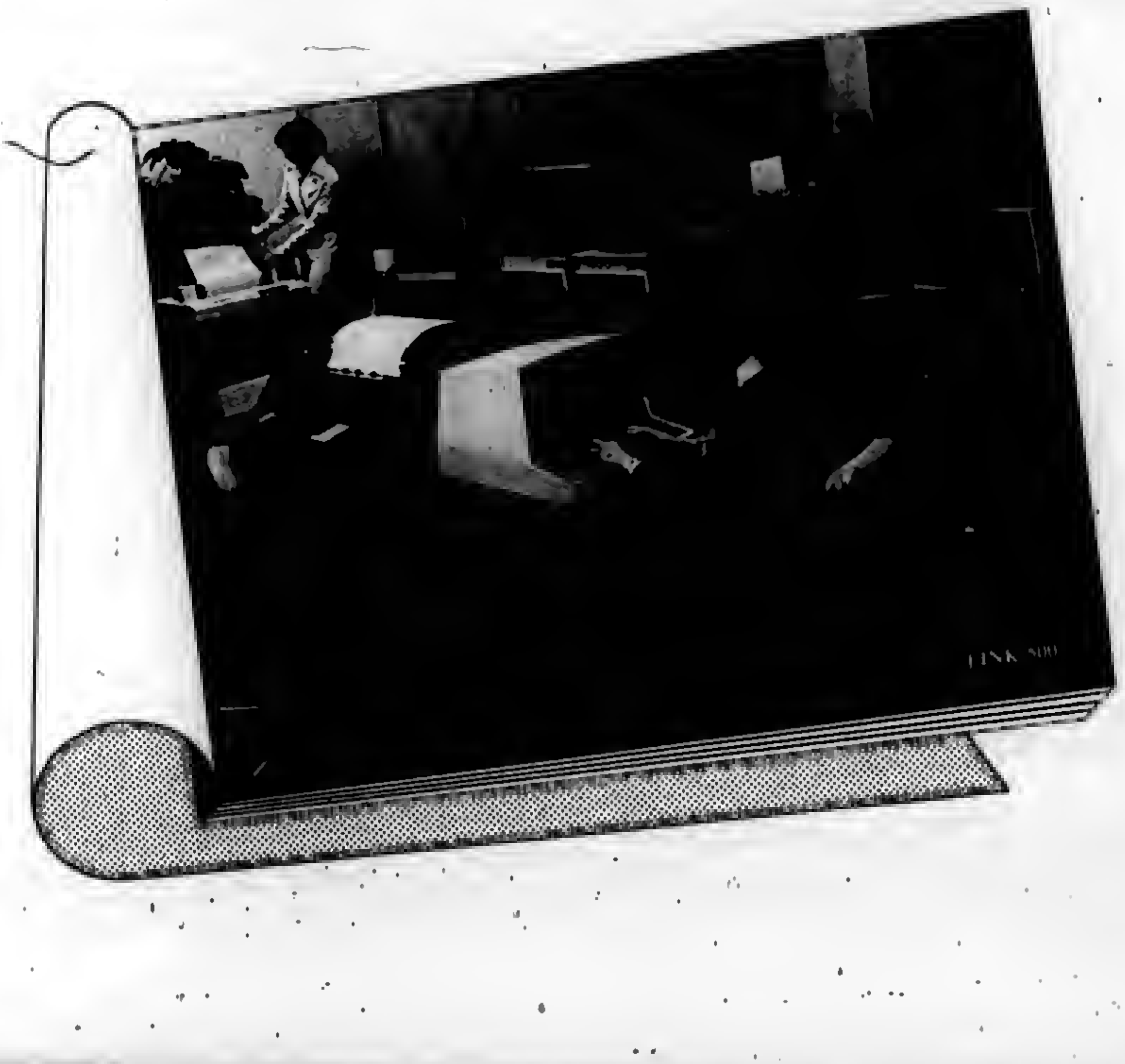

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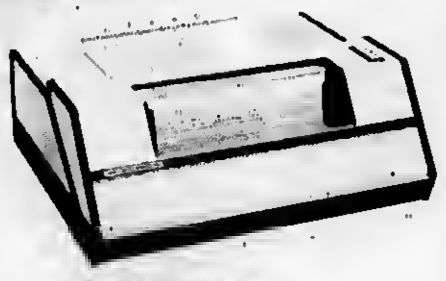

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Mini Makers Unveil CPUs and Systems

• TI Configures Commercial System

HOUSTON – Texas Instruments, Inc. has added three more members to its DS990 family of disk-based minis. The systems were designed for commercial end users as well as OEMs.

The models 4, 6 and 8 offer "extensive file management capabilities," TI claimed. They support multiple interactive users in a multilanguage environment.

Based on the firm's 990/10 CPU, the systems run under the DX10 operating system. All three can accommodate Cobol, Basic and Business Basic programming as well as Fortran IV with extensions, TI said.

The operating system provides multikey indexed file support; both batch and interactive processing can be run on the units, the company noted.

The Model 4, which can be used as a small multistation software development system or as a medium-scale application system, includes 128K bytes of memory; a 1,920-character Model 911 CRT with function keys and a separate numeric pad; 5M bytes of fixed and 5M bytes of removable disk storage; and either a single- or dual-bay

(*Continued* on *Page 42*)

• Wang Adds Mini For Novice Users

By Toni Wiseman
CW Staff

SAN FRANCISCO – Wang Laboratories, Inc. introduced several products, including a small system aimed at the first-time user, a printer/plotter and a graphics CRT, at the recent Western Electronic Show and Convention (Wescon '77) here.

Positioned between the Wang PCS-II minidiskette system and WCS/20 dual floppy, the WCS/15 is a full-purpose, diskette-based system for commercial, technical, scientific and educational applications including data entry, retrieval, editing and processing, Wang said.

The WCS/15 features a CPU with 16K bytes of user memory, a 12-in. CRT, keyboard and a single diskette drive.

The CPU has a standard random-access memory (RAM) expandable to 24K or 32K bytes; 700 bytes of RAM are dedicated to "housekeeping purposes," according to a spokesman.

A 42.5K-byte Basic language interpreter hard-wired in read-only memory translates and executes Wang's Basic instruction set,

(*Continued* on *Page 42*)

• Interdata Tops 16-Bit CPU Line

By Esther Surden
CW Staff

OCEANPORT, N.J. – The Model 8/16E minicomputer introduced recently by Interdata, Inc. reportedly provides users of the firm's 16-bit line with a direct upgrade path from their smaller systems to a CPU that can accommodate up to 256K bytes of memory.

The mini uses integral memory management hardware not found on Interdata's other 16-bit systems, a spokesman said. The Model 8/16E runs under an enhanced version of the OS/16 MT2 operating system and uses an extended Fortran IV language.

The system protects the user's software investment, however, since conversion to the OS/16 MT2 is "simple," he claimed. In addition, he said, users can move the peripherals used on their smaller systems to the larger mini.

Designed for use in scientific computation, process control, business DP and data communications applications, the Model 8/16E is in the range of the Digital Equipment Corp. PDP-11/34.

The memory management hardware allows

(*Continued* on *Page 42*)

Metal Part Producer Presses Out Orders

By Ann Dooley
CW Staff

BROCKWAY, Pa. – A manufacturer of heavy metal parts is grinding out orders using a minicomputer that has helped increase sales by speeding up almost every process, according to Michael Trunzo, DP manager at Brockway Pressed Metals, Inc.

Brockway chose a Burroughs Corp. B700 to replace an IBM System/3 because it was a "better overall system" considering the budget within which the DP department had to work, Trunzo said.

"It was more machinery for the money," he added. "Pricewise, it's hard to find a system that will give you so much."

Valued at $50,000, the system handles Brockway's 225-person payroll and its accounts payable, cash receivable, general ledger, sales analysis, budget and order tracking/implementation applications.

The B700 configuration consists of the CPU, one disk drive, two disk cartridges, one 160 line/min printer and two data recorders, one of which acts as a reader.

Previously, the work now processed on the B700 was performed by the System/3, but some very rapid growth made it difficult to retain that system, Trunzo recalled. "We needed more machinery with a better overall system that would enable us to process more information," he said.

Chosen for Service

Before going to the B700, Brockway looked at NCR Corp. and IBM equipment in addition to the Burroughs system. Because of its rural location, the company felt its best choice for service was Burroughs, Trunzo said. Brockway is located 140 miles from Pittsburgh, the nearest large city.

The B700 handles more than 160 programs, according to Trunzo. Burroughs did some of the programming and the rest was done in-house or by an outside software firm.

"We try to put it all together," Trunzo said. The order tracking system, one of the most recently developed, is turning out to be the most encompassing, he added.

Once an order is placed by a customer, a data base of fixed information is built around the order. The data file includes customer name and number, the part number, the quantities of each part ordered and the various operations through which each part must be routed.

Releases must then be issued to the production department to establish a production schedule. Next, the cost of the part is determined, including costs of the raw material and labor.

Throughout the process, reports are issued to the appropriate departments indicating the status of the part.

The usual files involved in most orders include the order file, the standard file that includes all of the costs involved and the labor and the raw materials file, according to Trunzo.

All of the information is keypunched onto cards, fed into the computer and routed to various disk files. The order tracking system branches out into all areas of the business and is used for almost "everything imaginable," Trunzo said.

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Small System Controls Firm's Diverse Interests

ST. PETERSBURG BEACH, Fla. — Resort Inns of America, the owner and operator of several hotels here, is using a small business system to gain increased control over its diverse business.

The company owns not only the hotels, but also has retail shops, an advertising agency, a hotel-oriented supply corporation and other hotel-related companies.

"Resort Inns of America is a rapidly growing corporation," Don Elliott, treasurer and controller explained. Because of that rapid growth, it decided it needed to automate, so it purchased a Century Computer, Inc., small business system.

"We became acquainted with Century when we bought one of its small tape computers from a dealer. The dealer has since become defunct and we have become a quasi-dealer ourselves," Elliott explained.

Presently the company has a larger, disk-based model. The disk-based system is responsible for the bookkeeping processing of three subsidiary corporations. It records and analyzes guest reservations for all five motels, records and analyzes all prior guest reservations for the past two years, follows through on promotional mailings to these prior guests, records and analyzes travel agent business (and follows through on personalized mailings to some 10,000 agents) and performs statistical analysis of all inquiries and the business that results from the inquiries.

"All programming is done by operating staff and input is accomplished by regular office personnel. We have telecommunications to the computer from the motels and two CRT terminals in the office," Elliott said.

Two members of management have portable terminals which enable them to communicate with the system from their homes, so "it is not unusual for input and querying to be going on over a 12-hour period," he said.

Basic accommodation data for the motels is housed in master files. Other files hold guest names (the chain does a 50% repeat business) and house the names and accounts of travel agents.

Reservations are centrally recorded and entered into the system daily, with a simultaneous entry made in the appropriate travel agent's file, updating his account.

"The Century 400 system prints out the reservations for the arrivals scheduled at each motel for the following day," Elliott said. "The system also prints out at scheduled intervals the lables for direct mail to previous guests."

Basic software for the system was provided by Century. Hardware consists of the CPU, 32K bytes of internal memory, 16-port multiplexer, two medium-speed line printers, one 10M-byte disk drive and disk controller, two CRT terminals with standard keyboards and the portable terminals.

Interdata Caps 16-Bit Line With 256K-Byte Machine

(Continued from Page 41)

the company to extend the system's physical memory beyond the previous limit of 64K bytes, the spokesman said. Program mapping is performed by implementing additional bits in the program status word.

Logical program space is viewed as 64K-byte areas, regardless of physical location. Additional instructions control the additional bits, the company explained.

A 16-bit extended selector channel handles mapping for direct memory operation to extended addressing areas, the spokesman added.

A Memory Protect Controller allows users to protect their software by allocating selected blocks of memory to either write protect, read/write protect or instruction execution protect, according to Interdata.

With this feature, memory can be partitioned into a maximum of 64 blocks, with individual protection for each block. Block sizes of either 512-, 1K- or 2K bytes are accommodated.

The revised operating system performs real-time, multitasking operations in an event-driven environment. The system manages system resources, including access to the processor, with up to 255 levels of priority defined by the user, Interdata said.

It also provides intertask communications and control facilities, including task-common and reentrant libraries, which allow users to create applications required by transaction processing, the company noted.

Another feature of the enhanced operating system is an embedded Command Substitution System (CSS). The CSS allows users to create operational procedures on disk, "permitting reexecution later with a single command," the spokesman said.

The Fortran IV compiler operates in about 21K bytes of memory and directly generates object code, according to Interdata. It is said to exceed the requirements of Ansi-standard Fortran.

A typical 128K-byte 8/16E system with 10M bytes of disk, CRT console, operating system and Fortran IV costs $27,645. The Fortran IV compiler costs $550 and the OS/16 MT2 operating system costs $1,700. Interdata is located at 2 Crescent Place, Oceanport, N.J. 07757.

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Wang Mini Suits Novices

(Continued from Page 41)

he added:

The CRT displays 16 lines of 64 char./line; a display with 24 lines of 80 char./line is optional. The CRT's cursor can be operated under program control using eight available cursor-positioning codes, the spokesman noted.

The WCS/15 has a standard single diskette or optional dual diskette drive which increases the standard 262K bytes of on-line storage to 524K bytes, Wang said. Access time is 14 msec on one track.

Communications options include Teletype or IBM 2741 protocols or batch transmission to or from a host system via IBM's 2780, 3780 or 3741 Binary Synchronous Communications (BSC) protocols.

The basic price of the WCS/15 is $10,200. With a second diskette drive and a 2231W matrix printer, the system costs $14,600.

Graphics Devices

Wang also unveiled its 2282 graphics CRT and 2231W-3 matrix printer. The two were designed to combine easily revised visual plotting and fast hard copy for a total approach to graphics that range from bar charts and pie charts to large engineering drawings and maps, Wang claimed.

The Model 2282 has a 12-in. diagonal screen with a 7-in. wide by six-in. high viewing area. The graphics matrix on the screen consists of 800X by 512Y addressable locations.

In addition to plotting line vectors, a 112-character Ascii set can be plotted on the Model 2282 in 15 different sizes, the firm added.

The CRT uses a standard line printer controller-CPU interface. When used with the Model 2231W-3 line printer, the printer cable plugs into the output connector of the 2282.

The 231W-3 printer provides a hard copy of the graphics information displayed on the 2282 CRT. The hard copy is generated by printing strips of 800- by 8 dots.

The Model 2282 CRT costs $3,600 and the 2231W-3 line printer costs $3,800 from Wang at One Industrial Ave., Lowell, Mass. 01851.

TI Configures Commercial Unit

(Continued from Page 41)

desk.

A licensed copy of the operating system and software development facilities such as a macro assembler, interactive source editor and overlay-supported link editor are available.

The Model 6, which can be used in larger data base applications, has a 128K-byte processor, a CRT and two 25M-byte removable pack disk drives.

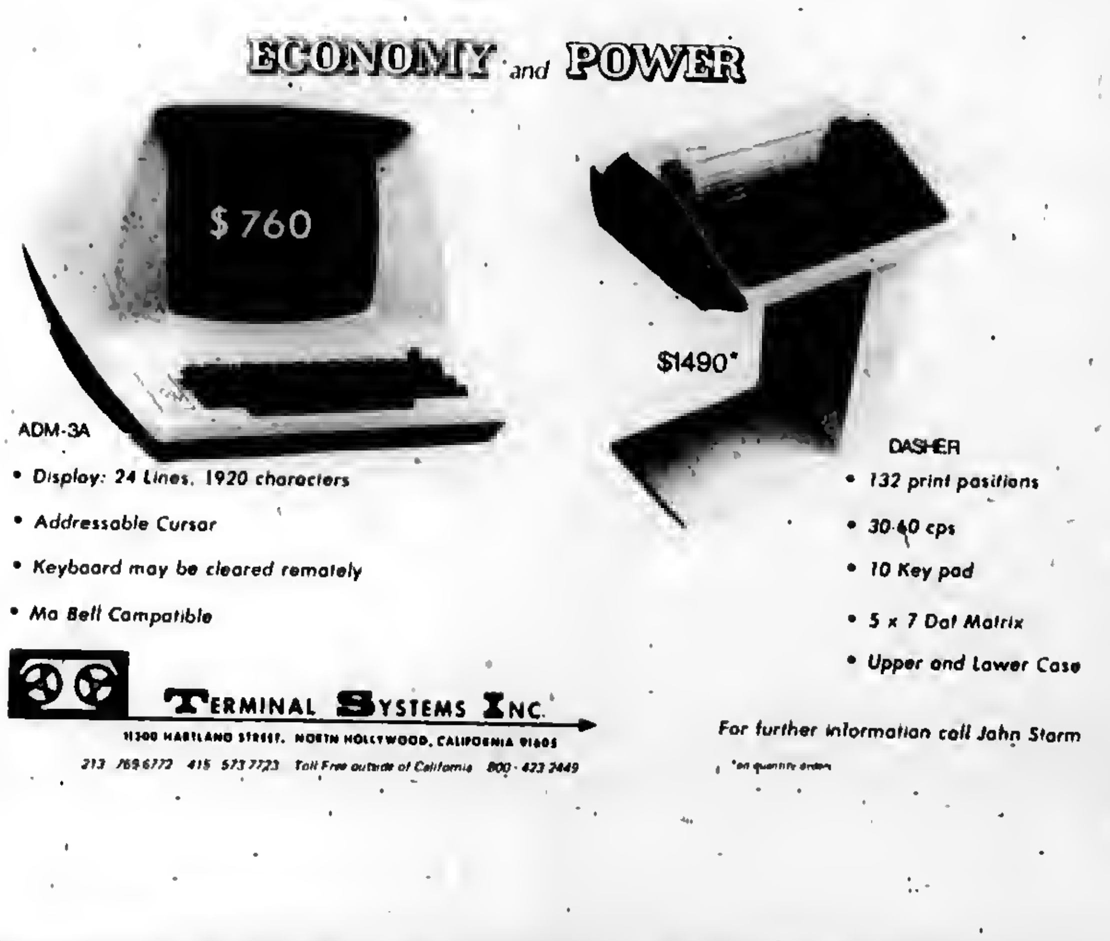
The Model 8, designed for large data base applications, includes the 128K-byte processor, the CRT and two 50M-byte disk drives.

The Model 4 costs $27,400 including operating software and installation; a hardware-only version without operating software and installation costs $24,500.

The Model 6 costs $40,600 including installation, operating software and a one-year software update subscription service. The hardware-only version costs $37,400.

The Model 8 with the update service, installation and software costs $50,800; the stripped-down version is priced at $47,400.

The systems should be available in late October, TI said from its Digital System Division, M/S 784, P.O. Box 1444, Houston, Texas 77001.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Strategies — Part 1

Timely Measurements Ensure Reliable Operations

Special to Computerworld

Most companies are problem-oriented rather than technique-oriented. Successful businessmen recognize this and avoid letting any subjective element influence them in the search for proper methods to solve problems. This article attempts to provide management with objective methods to measure and evaluate current and planned computer operations and related systems development activities.

Top management wants to know how effective the management of each minicomputer site is. It is not just the minicomputer system's performance, but rather the performance of all DP activities at the site that needs to be measured.

This cannot simply be done by looking at the current costs vs. the planned costs of each site. This form of measurement reflects what has happened rather than what was possible. It measures the immediate effect of operating decisions but not the quality of those decisions.

In our approach to the evaluation problem, we begin by defining management planning for minicomputer systems. This method involves the identification of important planning tasks and use of a planning methodology that leads to development of "planned performance."

This takes into account changing minicomputer technical trends in hardware and software tools that affect production efficiency and cost effectiveness. This evaluation process should be repeated several times a year for each computer location.

Major Tasks

The seven major tasks in the planning process for each minicomputer location are:

- Determine current workload of the data center.
- Determine future workload requirements.
- Define workload capacity and performance of current configuration (hardware and software).
- Define projected (required) capacity and performance of minicomputer configuration (hardware and software).
- Determine user response times and other production requirements.
- Determine overall minicomputer site performance criteria.
- Determine planned costs and performance of the minicomputer site.

The current workload for each shift over the work week can be initially divided into three major categories: production, development and system overhead.

It is important to establish workload criteria because they tend to be overall guidelines for determining current utilization. The analysis of the current workload will provide sufficient data to determine:

- The hardware/software configuration(s) match to the job mix.
- The effectiveness of the scheduling procedure.
- The effect of data management options on timeliness and responsiveness of overall site performance (e.g., file management, data base management; on-line terminal data entry, data base inquiry and update; or batch processing options).
- The effect of minicomputer software tools on systems development and maintenance costs.
- The effect of minicomputer systems on capacity management, processing and cost/performance.

This is the first part of a two-part series on objective methods to measure and evaluate current and planned minicomputer operations and systems development activities. The article was prepared by the marketing department of Data General Corp.

Measurement Impact

Each of these categories should be examined in detail, because they exhibit different measurement impact on total system resources.

Production workloads can be divided into on-line or time-sharing and batch, either scheduled or unscheduled.

The emphasis in the DP production environment should be optimization of job mix processing throughput and user response time during each shift.

This requires the analysis of several approaches, including establishing special job classes for "must have" scheduled time-sharing and batch production, liaison with users to validate need for production during prime shifts, and tight control over unscheduled batch jobs to ensure that resources are not being abused by jobs that are not actually priority production jobs.

Standards, together with systems user discipline must be present to achieve an optimization of computer site resources and services.

Line Printers Ease Jams

HOUSTON — Southwestern System Services, Inc. has introduced a series of minicomputer line printers that incorporate a microprocessor which in case of a paper jam, allows the last few pages to be reprinted "at the touch of a button."

Called Paragon, the Model V29 model printer includes a Centronics Data Computer Corp. compatible interface, program-controlled horizontal and vertical tabs, absolute horizontal and vertical tabs, automatic bottom-of-page, automatic page heading and numbering, single-line or single-page print and built-in diagnostic patterns, the company said.

With the V29X, users can get 16K bytes of storage that records the most recent printed output in the micro's random-access memory.

The V29 costs $5,995 and the V29X costs $7,465. Deliveries will begin in January, Soutwestern said from Suite 110, 6116 Skyline Drive, Houston, Texas 77057.

In Applications, Technology

Micro Report Analyzes Growth, Outlook

By Frank Vaughan
CW Staff

PENNSAUKEN, N.J. — Since the introduction of the microprocessor by Intel Corp. in 1970, technical and applications developments have grown at an explosive rate, according to a report prepared by Infotech International Ltd. and distributed by Auerbach Publishers, Inc.

These developments have taken place in the areas of large-scale integration (LSI) technology, microprocessor architecture, applications and development systems, it added, noting that outside industry the impact of microprocessors will be considerable, with some forecasts predicting that most homes will have at least 10 microprocessors serving various domestic appliances.

Within industry, there will be considerable changes in the kinds of expertise required to produce microprocessor-based products.

"Interfacing microprocessors to memory and I/O devices poses many of the problems that are found in minicomputers and indeed, many of the same solutions are used. Typically, I/O is provided by bus structure and the flow of data is controlled by program, direct memory access (DMA) or interrupt mechanisms. Microprocessors tend to be less complex than minicomputers, and to alleviate difficulties caused by this, many manufacturers supply special hardware that simplifies the interfacing problem."

I/O Design

"I/O is a critical aspect of microprocessor system design: the high cost-effectiveness of the microprocessor chip in terms of providing processing power can only be realized if the I/O architecture matches the processor in efficiency," the report contended.

"Clearly the major determinant of the kinds of bus structures that can be implemented is the control signal configuration of the microprocessor chip, which is itself determined by the available pins.

"The user has considerable freedom in the way in which he allocates the pins to functions and different benefits can be achieved by different strategies," the report suggested. It goes on to outline several of these strategies and includes some of the tradeoffs that can affect the choice of the designs.

The explosive growth of microprocessors has caused some problems in definition, and definitions often fail to include devices which may be reasonably considered to be microprocessors, while including devices which might equally reasonably be considered not to be microprocessors, the report said.

The report summarizes the main characteristics of the microprocessor: it is an electronic logic device that consists of one or very few LSI circuits. Further, it is a stored program computer capable of being used both as a replacement for random logic and as a processing element in a computing system.

In examining the use of microprocessors, the report looked at seven applications areas:

- Process Control. The industrial uses of microprocessors are potentially enormous and almost every aspect of modern manufacturing techniques is amenable to logical control by computer devices, it said.
- Testing and Instrumentation. The report observed that instrument designers have realized the advantages of the use of micros. Designers are turning toward the application of microprocessors in a broad range of instruments, from the replacement for electrical power meters in households to smart, programmable instruments.
- Telecommunication. Infotech suggested that microprocessors are being applied in this field and hold considerable promise.
- Data Capture. This is reported to be a major growth area for microprocessors, used both as controllers in data capture terminals and in complex laboratory and industrial applications.
- Commercial DP. The report noted that "the DP world has not yet woken up to what micros are about: they are just beginning to."
- Portable/Personal Computers. Infotech discusses the use of microprocessors in the role of providing a low-cost, powerful personal computing capability.
- Consumer Products. The report predicts that many applications areas — other than calculators, watches and games — will emerge in the future.

Other topics in the first volume of the report include multi-microprocessor systems; evaluation and selection; design and development; software and manning.

Volume 2 of the set is a collection of invited papers from which much of the data in Volume 1 is drawn. The two-volume set costs $215 from Auerbach Publishers, 6560 N. Park Drive, Pennsauken, N.J. 08109.

Micro Bytes

MFE Reduces Prices On Two I/O Boards

SALEM, N.H. — MFE Corp. has reduced the price of two of its interface boards for the Model 250B digital cassette transport.

The average price of option 214PAR, which is for Parallel I/O for 8-bit computers, has been reduced 20% to $260. The price of option 204SER, intended for serial I/O for data communications, has been dropped 10% to $135, according to a spokesman.

OEM discounts are available, the spokesman said from Keewaydin Drive, Salem, N.H. 03079.

Free Catalog Lists Products

FAYETTEVILLE, N.Y. — Computer Enterprises is offering a free microcomputer catalog "Computerlogue" that is "star-dated" for this fall.

The catalog contains several hundred product listings from various manufacturers and contains the retail price, cash discount price and credit card price of every item.

The catalog may be obtained by writing to Computer Enterprises, P.O. Box 71, Fayetteville, N.Y. 13066.

Tool Inserts IC Packages

BRONX, N.Y. — OK Machine and Tool Corp. has introduced a tool that inserts both 14-pin and 16-pin integrated circuit packages into sockets or predrilled boards.

The INS-1416 includes a pin straightener and costs $3.49 from electronics distributors or directly from the firm at 3455 Conner St., Bronx, N.Y. 10475.

Polymorphic Has Diskette System

SANTA BARBARA, Calif. — Polymorphic Systems has introduced its System 8813, an 8080A-based, diskette-oriented microcomputer system.

The basic system comes with power supply, chassis, cabinet, 10-slot backplane, microprocessor card, floppy disk controller, 16K bytes of random access memory (RAM) and 3K bytes of read-only memory (ROM). It also includes a fan, keyboard with cable, floppy disk drive and two system disks. The system can accommodate up to two additional floppy disk drives, according to a spokesman.

Software for the system includes a disk operating system; disk Basic, with file handling structure; and assembler with a two-dimensional editor that is not line-oriented and a text editor that can edit any system file, the spokesman said.

Prices for System 8813 start at $3,250 from the firm at 460 Ward Drive, Santa Barbara, Calif. 93111.

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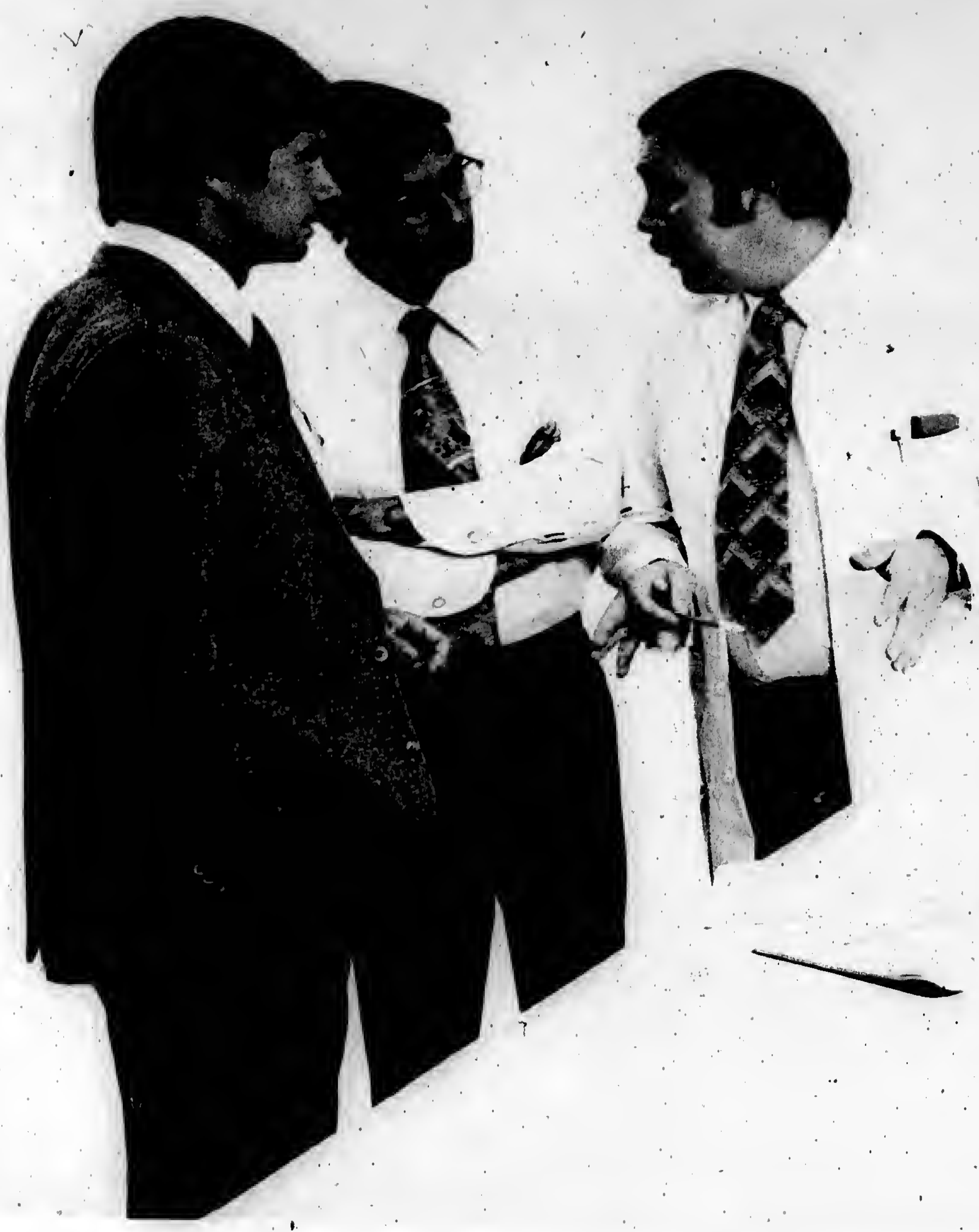

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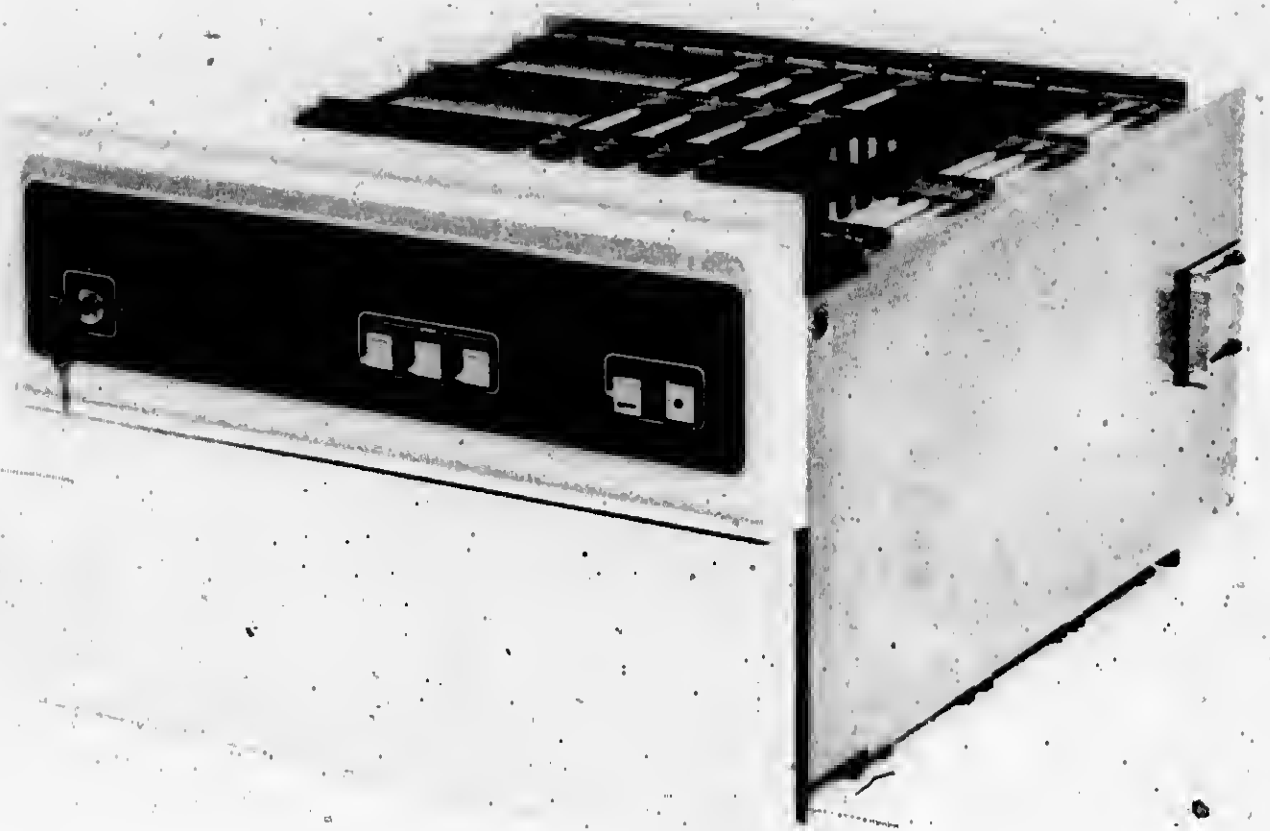

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Unit Uses PDP-8 Programs

SAN RAMON, Calif. — Pacific Cyber/Metrix, Inc. (PCM) has introduced a 12-bit microcomputer system that is reportedly software-compatible with Digital Equipment Corp.'s PDP-8 minicomputer family and sells for less than $1,000.

The PCM-12 incorporates Intersil's IM6100 12-bit microprocessor unit (MPU). The IM6100's instruction set is identical to the PDP-8's and the PCM-12 user can use all of the programs and operating systems developed for the PDP-8 family, a PCM spokesman claimed.

The basic price of $989 assembled and $679 for kits includes the MPU; a memory system that can be expanded to 32K bytes; front panel module with built-in bootstrap loader and control programmable read-only memory (Prom) chips; power supply; backplane bus structure; 15-slot cabinet; and user manuals, the spokesman said.

The system was designed for adding vectored priority interrupts and direct memory access. It also features an 80-line total transistor logic (TTL)-compatible bus.

PCM is located at 3120 Crow Canyon Road, San Ramon, Calif. 95483.

Camelot Offers DP Dictionary

ORMOND BEACH, Fla. — Camelot Publishing Co. has announced the printing of Donald Spencer's *Computer Dictionary.*

The dictionary contains, in addition to standard definitions, features on computer organizations, the metric system, biographies, programming languages, personal computers, history, computers in society, management, education and computer professionals.

The book stresses clarity, and definitions stand as independent units of explanation, according to a spokesman.

The book sells for $5.95 in paperback and $9.95 in hardcover from the publisher at P.O. Box 1357, Ormond Beach, Fla. 32074.

OTI Device Programs Eproms

EARLYSVILLE, Va. — Optimal Technology, Inc. (OTI) here has introduced a programmer for 2708- and 2716-type erasable programmable read-only memory (Eprom).

The programmer requires the use of one and a half I/O ports of any 5V microcomputer, according to a spokesman. The programmer is packaged on a printed circuit board and furnished with software for the Motorola 6800 D1 or D2 kits or the Fairchild F-8 kit number 1, he said.

Assembled and tested with software, the programmer costs $59.95. The programmer without software but with software instructions costs $33 in a kit.

OTI is at Blue Wood 127, Earlysville, Va. 22936.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Despite Unresolved Issues

Bank Terminals to Double by 1981: CSI

By Toni Wiseman
CW Staff

SAN JOSE, Calif. — Banking automation is caught up in a series of hassles ranging from consumer resistance and technological roadblocks to legal and regulatory decisions as to whether or not automated terminals should be considered branches of the installing financial institutions, according to Creative Strategies, Inc. (CSI).

The installed base of banking automation terminals, including on-line teller terminals (OLTT), automated teller machines (ATM) and point-of-sale (POS) devices, will more than double in the next five years, increasing in value from $906.5 million to $2.1 billion — a compound annual growth rate of 18.5%, CSI forecast.

The potential market for these terminals is "vast," the report said, noting there are some 43,000 financial institutions of all types in the U.S., encompassing 85,000 locations.

Nearly 61,000 OLTTs, valued at $715 million, are currently installed. CSI expects that figure to reach 117,250 units, almost double, in the next five years.

The 1976 installed base of ATMs is 5,250, valued at about $184 million. CSI predicts shipments of 18,250 units over the five-year period to 1981.

The installed base for POS devices in 1976 was estimated at 10,000 terminals, valued around $7.5 million. This market is predicted to grow to an installed base of 150,000 terminals by 1981.

In all three markets, CSI predicted an average price-per-unit drop of 15% to 20% over the five-year period.

However, before the ATM market can stablilize and begin a predictable growth pattern, several issues will have to be resolved. These include:

- Legal and regulatory interpretations as to whether these machines represent branch operations of a particular financial service institution.
- Antitrust issues related to the sharing of a common terminal.
- Economic justifications.
- Consumer acceptance.
- Development of the "debit card."

Banking Marketplace

A recent study conducted by Payment Systems, Inc. (PSI) showed that most financial institution marketing executives plan to be participating in some sort of electronic funds transfer (EFT) program within the next several years — or else have already begun. In fact, 93% of all commercial bank respondents predicted their institutions would have ATMs by 1980, CSI stated.

Likewise, 86% of all mutual savings banks and savings and loan associations anticipated they would have at least one ATM by 1980, the PSI study showed, and only 5% of all financial institution respondents believed they would not be participating in a POS system within the next five years.

"Of the 85,000 financial service locations which are potential installation sites for OLTTs and ATMs, some are more likely locations than others. Manufacturers of these terminals generally (though not exclusively) direct their marketing to FSIs [financial service institutions] with over $25 million in deposits," CSI said.

The market for OLTTs is centered around commercial banks, the report said, noting that currently, about 10% of all banks are on-line, while over 75% of savings and loans

(*Continued on Page 50*)

Young HP President; Hewlett Moves Upstairs

PALO ALTO, Calif. — John A. Young, executive vice-president in charge of the computers, instruments and components groups, has been elected president of Hewlett-Packard Co.

He succeeds William R. Hewlett, who becomes chairman of the executive committee and will continue as chief executive officer. Hewlett will be 65 in June.

The changes are effective Nov. 1. Dean O. Morton, vice-president in charge of the medical electronics group in Waltham, Mass., will relocate to assume direction of the instruments, medical and analytical groups. Executive vice-president Ralph Lee will handle the computers and instruments groups as well as calculators.

Home Computer Market Seen Topping $1.5 Billion by 1985

By Toni Wiseman
CW Staff

SAN FRANCISCO — What started as a computer hobby market barely three years ago has all the promise of becoming the next billion-dollar market for electronics — particularly since the transition from hobby computer to home computer has already happened, speakers at Wescon 77 said here.

By 1985, the market for home computers is expected to be over $1.5 billion, with an additional $800 million going into small business applications, the speakers predicted.

In summarizing the situation, Frank J. Burge, vice-president of Regis McKenna, Inc., noted "Macy's of California is selling computers . . . So are the 6,000 outlets of Radio Shack . . . and Heath Co. Can Sears and Montgomery Ward be far behind?"

Bob Wickham, president of Vantage Research, noted that home computers are only one segment of the personal computer market — a market which today has an installed base of some 50,000 units. This Christmas season should add another 30,000 to 50,000 to that figure, he said.

The personal computer market will have both consumer and professional segments, with the hobby market occupying the area in which the two overlap. All these computers will be characterized by a CPU with random-access memnory (RAM) program storage, user programmability, high-level language, interactive operation, alphanumeric keyboard and display, tabletop size and single user orientation, he said.

The professional segment includes personal computers directed at engineering, scientific and business users for individual problem solving and data processing, such as those used in doctors' offices and by CPA firms, he said. Prices in this market range

(*Continued on Page 52*)

CW at Wescon

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Schweber to Distribute DG Micronova Line

WESTBORO, Mass. — Data General Corp. is expanding its sales techniques by offering Micronova hardware and software through Schweber Electronics Corp., a distributor of electronics and microprocessors.

New Channel Opened

Herb Richman, senior vice-president of DG, said the move opens up a "major new channel of distribution for the computer industry."

"We will now be selling a full computer system complete with software through the same off-the-shelf distribution channels used to achieve maximum market penetration for semiconductor parts," he added.

DG field service contracts will be available on goods sold through Schweber, Schweber said.

Under an agreement with DG, Schweber will stock and sell DG's line of 16-bit microprocessor products including the Micronova processor, chips, boards, software, packaged computers and peripheral equipment.

Schweber's technical sales staff will offer the Micronova line locally throughout the U.S.

Individual Needs Addressed

Seymour Schweber, president, said this represents the first step taken in years within the industry to address the increasing individual needs of local customers of computer equipment.

"The computer industry itself admits that it doesn't know in what exciting new ways customers will put their equipment to use next," he said. "Yet those same users need all the assistance they can get in understanding how to apply complex microprocessor technology to their own retail business, service operation or whatever."

Terminals Seen Doubling

(Continued from Page 49)

and mutual savings banks are on-line.

CSI forecast that about 80,695 terminals will be installed by 1978, with over 92,200 at 23,850 locations by 1979. By the end of 1980, nearly 60% of all large institutions will have systems installed with more on order. This would account for 104,775 terminals serving 26,775 banking locations at that time, it said.

Meanwhile, the market for ATMs and cash dispensers should grow from 5,250 installed units, at an average price per terminal of $35,000, at the end of 1976 to a total of 23,500 units, costing $30,000 per terminal, in 1981, the report suggested.

"One obvious trend is currently taking place in this industry. Though they are $10,000 to $20,000 more expensive, full-service ATMs are being installed on a three-to-one basis over cash dispensers," CSI commented.

Competitive Factors

Burroughs continues to dominate the OLTT industry, followed by NCR, IBM and Bunker Ramo. These four account for some 85% of the total installed base today, CSI reported. That status quo should remain virtually unchanged for the next five years, it added.

The ATM/cash dispenser market is strongly dominated by Docutel Corp., although IBM and Burroughs, because of their strong reputation in the financial industry and their "total systems" approach, should grow considerably in the next five years, the report observed.

Capital Requirements

Capital requirements appear to be the major barrier to entrance into this market, since new entrants are required to finance a considerable market, CSI said.

The POS device market's main force is Transaction Technology, Inc., a subsidiary of Citibank Corp., and is followed by Datatrol's Amcat terminal, CSI said.

In the next five years, however, "AT&T's Transaction Telephone should emerge from the pack to throughly dominate the market," CSI said.

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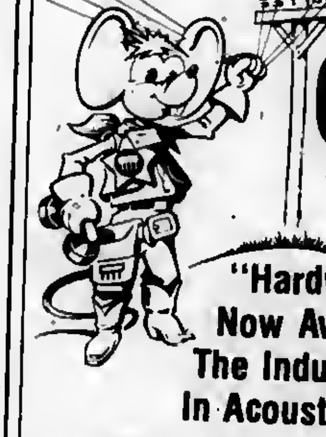

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No Free Lunch

Micro Designers Facing Choice of Languages

By Toni Wiseman
CW Staff

SAN FRANCISCO — Microcomputer programming languages are becoming even more prolific than micros themselves, attendees of the Western Electronic Show and Convention (Wescon) were told here recently.

As a result, the designer is faced with choosing among Basic, Fortran, Assembly languages and a host of proprietary offerings, according to Carol Ann Ogdin of *EDN Magazine*.

And, she noted, some of the languages touted as "standard" simply are not.

Taking a look at the alternatives facing a designer, Ogdin said, there is no such thing as a free lunch. "Programs that result from a compiler are generally longer and require more time to execute than those written by a highly skilled Assembly language programmer," she said.

However, the traditional argument in favor of Assembly language may be out of date, she cautioned.

"Using some of the most sophisticated compilers, such as IBM's Fortran-H, it is hard for a mediocre programmer to generate programs that are as efficient. Even good programmers have a hard time beating that translator's efficiency," she said.

"Such optimizing compilers haven't yet been generated for micros, though," she admitted.

Real Trade-Off

The essential trade-off a designer must make is between the cost of program development and the life cycle cost in production, Ogdin told the audience. There is a significant part of the cost of writing programs which is not affected by the language choice, she pointed out.

"The analysis of the application, algorithm selection and program design activities usually proceed without being affected by the language choice," she said.

"Some outrageous claims of '10-to-1 reductions in programming costs' have appeared in print, but these refer solely to the coding and testing time, not design effort.

"In well-designed programs, more than two-thirds of the dollars are spent before code is even written, so the savings may not be as great as the seller would like to claim," she stated.

In order to achieve overall reductions in program size — not just speed — the entire program should be written in Assembly language, she said.

"If the anticipated production volume is one to two, there is hardly justification for using Assembly language.

"If, however, five or more copies of such a program are required, the extra programming effort to save the cost of five or more memory cards may be worthwhile," she said.

The microprocessor represents an extreme case since the number of units of production may be in the hundreds or thousands and the additional software development costs can therefore be recouped quickly.

Ogdin predicted the trend toward high-level languges will continue, especially in light of recent Department of Defense (DOD) language standardization efforts and the continued increase in the size of program storage read-only memory (ROM).

DOD is evaluating future language options for standardization, she remarked, noting the general acceptance of one particular language for real-time control applications will mean more compilers available for general use.

In addition, larger ROMs mean the incentive for Assembly language programming will diminish and compilers and interpreters may be distributed in ROM form, she said.

CW
At Wescon

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TEXAS INSTRUMENTS.

Products Bow at Western Electronics Show

Adar Unveils MX-17 Micro Test System

Adar Associates, Inc. introduced its MX-17, microprocessor test system at the Western Electronic Show and Convention (Wescon) in San Francisco.

Designed as a low-cost, high-performance approach to testing microprocessors, microprocessor support chips, read-only memory (ROM), random-access memories (RAM) and other semiconductor devices, the MX-17 is said to provide testing in a "conditioned natural environment."

OEM Products

The logic sequence through which the device under test is exercised is written in the language of the microprocessor itself.

The MX-17 also gives the user fully programmable control over all test variables, including logic levels, bias voltages, timing edge placement and formatting of data, addresses and clocks, the company said.

Priced at $3,500, the MX-17 is scheduled for initial deliveries in the fourth quarter of 1977 from 11B North Ave., Burlington, Mass. 01803.

Mostek Memories Fit Nova 3, Larger Machines

Mostek Corp. was at the show with its MK8003 Nova 3 compatible memory card and MK8000 128K by 24-bit memory system.

The MK8003, which is said to be compatible with Data General Corp. Nova Models 3/4, 3/12 and 3/D, allows the user to place the maximum addressable memory for the Nova 3 series in only two card slots, freeing up additional slots for I/O, the firm said.

The MK8003 is built on a single 15-in. by 15-in. PC card and features an access time of 350 nsec maximum and cycle time of 700 nsec maximum, the firm claimed.

Operating modes include read, write, read/modify/write and refresh. Capacity is 128K-, 64K-, 32K- or 16K words by 17 bits.

Delivery is 45 to 60 days for the MK8003, which is priced at $8,250 in single quantities. OEM discounts are available.

The MK8000 series was designed to provide the OEM with a single memory card that can be used in a variety of applications — including 16K by 18 small processor storage and 1M-byte large computer main memory and mass rotating media replacement, Mostek said.

Access time is 250 nsec and cycle time is 450 nsec, according to the firm. The MK8000 is $7,560 in single quantities and OEM discounts are available from the firm at 1215 W. Crosby Road, Carrollton, Texas 75006.

Readers/Transmitters Shown by Admaster

Admaster Corp. introduced three configurations of the Model 612 stand-alone paper tape reader/-transmitter.

The Model 612 features up to 150 char./sec sychronous or asynchronous parallel transmission rate or 50- to 9,600 bit/sec serial transmission rate, internally switch-selectable.

The 612-1 parallel TTL level configuration costs $625; the 612-2 EIA RS-232C serial and TTL parallel $725; and the 612-3 current loop serial and TTL parallel $725 in quantity one. Deliveries are scheduled to begin in late October from 416 Junipero Serro Drive, San Gabriel, Calif. 91776.

Home DP Mart Seen Flourishing

(Continued from Page 49)

from $6,000 to $20,000.

The hobby market, which has only been around for about two years, is comprised primarily of kit products directed at the electronic experimenter/hobbyist. These CPU kits retail from $700 to $900. Peripherals, however, can raise the cost of the finished product to a $2,000 investment by the user.

While professional and hobby computer markets are estimated at $105 million and $38 million respectively for 1976, they will soon be outdistanced by the home or consumer computer market, which by 1982 is expected to account for 55% of personal computer sales and show the highest growth rate, he stated.

In 1978, the professional computer market will reach $140 million, Wickham estimated, while hobby computers will hit $120 million and consumer computers $100 million. By 1980, however, the picture will have changed, with the markets estimated at $200 million for professionals, $187 million for hobbyists and $385 million for consumers, he said.

Projected further out, the consumer computer is expected to be a $1.25-billion market opportunity in 1985, he remarked.

A key ingredient in the growth of the home computer market is the availability of maintenance services and support activities to extend the usefulness of the systems, Wickham pointed out.

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Department Backs S. 825

Commerce Claims Voluntary Standards Unfair

WASHINGTON, D.C. — The current voluntary standards procedures, frequently marked by a lack of due process, often discriminate against small business and the consumer, according to a report prepared by the U.S. Department of Commerce and presented to the Office of Management and Budget (OMB).

Those currently involved in setting standards are those who can afford the time and funds to participate in the decision-making process; many who are affected by the particular standard being created are therefore often excluded from the process, according to the report.

The report, "Voluntary Standards and Testing Laboratory Accreditation," backed the pending legislation S. 825 that would create an independent government-financed standards board and an Institute of Standards and Accreditation in the National Bureau of Standards [CW, July 11]. S. 825 is called the Voluntary Standards and Accreditation Act of 1977.

The Commerce study examined four alternative ways of ensuring that minimum due process safeguards are incorporated in all private standards development organizations, testing laboratories and certification agencies.

In addressing the issue of National Standardization, the report recommended supporting S. 825 over the other three alternatives — OMB directives, establishment of a voluntary cooperative program by the Department of Commerce and regulations promulgated by the Federal Trade Commission (FTC).

Title I of S. 825 provides for the development of a uniform national standardization process for standards and certification activities undertaken by the private sector.

The legislation would empower the FTC to make procedural rules for standards development, product testing and certification.

It also would provide for enforcement by the FTC and judicial review of those FTC rules orders and decisions made pursuant to Title I, the study said.

Among the alternative methods of promoting national standardization was the OMB directive scheme. This would permit federal agencies to limit their participation in private standard development activities to those with minimum due process safeguards.

Agencies adopting such standards would not "unduly inhibit competition, restrict technological innovation or disadvantage small business or consumers," according to the report.

The second alternative, a cooperative Department of Commerce program, would empower the Secretary of Commerce to accredit private standards development organizations and product certification agencies that voluntarily included the due process safeguards in their procedures.

The third alternative was that the FTC would require such minimum due process safeguards.

Executive Order

For international standards the report recommended not S. 825 but an executive order, which would empower the secretary of commerce to promote U.S. participation and representation in international voluntary standardization activities and work with private and public bodies to achieve a coordinated effort.

Furthermore, the executive order would provide presidential authority for the Interagency Committee on Standards Policy which was recently reestablished, the report stated.

Regarding accreditation of testing laboratories, the report also endorsed executive branch action under which the OMB could require agencies to use the Commerce's National Voluntary laboratory accreditation program.

The fourth section of the report focused on the need for a national policy on standardization and recommended that a Presidential commission undertake a study of the alternatives and their effects on the current functions being supplied by the private sector. The report recommended opposition of Title IV of S. 825.

The study, which would determine the parameters of a national policy on standardization, should consider the following alternatives, according to the report:

- Provision of a federal charter for the American National Standards Institute (Ansi).
- Establishment of a National Standards Council.
- Establishment of a National Standards Management Board as proposed in Title IV of S. 825.
- Establishment of a "quasi-public corporation" for standardization as proposed by the Subcouncil on Product Safety of the National Business Council for Consumer Affairs.
- Promulgation of an executive order which should "establish a national standardization policy under voluntary framework for implementation between the federal government and the private sector."

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International News

UK's DP Sales to Grow 11.5%/Year: Commerce

WASHINGTON, D.C. — Sales of computer and peripheral equipment in the UK are expected to grow at an average annual rate of 11.5% through the remainder of the decade to reach a level of $1.2 billion in 1980, according to U.S. Department of Commerce figures.

The intensified use of DP equipment is expected to result from more attractive computer prices and profit margin erosion under the combined pressures of inflation and recession.

"While the UK is an important EDP equipment producer nation, it is expected to remain a major importer of this equipment, as most local production is shipped to foreign markets. U.S. suppliers, whose equipment has traditionally found a highly favorable market among British end users, are expected to continue as market leaders, supplying 63% of imported computers and peripherals in 1980," Commerce stated.

By industry sector, sales to manufacturing are expected to grow 5% annually, banking 16%, retailing and utilities 13%, service bureaus 12% and both government and transportation 11%, according to Commerce estimates.

Despite its low growth rate, manufacturing will remain the single most important group in terms of DP investments, with expenditures on computers and peripherals of $266 million projected for 1980.

Sales to Government

The British government is second in terms of sales, representing expenditures of $93 million in 1974, which are expected to grow to $176 million in 1980.

"The central government is a significant force in the market because of its extensive programs involving research and development of computer applications and its strong participation in EDP policymaking within other user sectors, e.g., within the universities and the nationalized industries (British Rail; the National Coal Board, the Post Office)," Commerce noted.

The populations of medium- and large-scale computers are forecast to grow at an average annual rate of about 5% and 3%, respectively, from 1974 through the end of the decade.

On the other hand, significant price reductions are projected to encourage more than a doubling of small computer installations and a tripling of the minicomputer population between 1974 and 1980.

Direct Purchasing

British users favor multisource and direct purchasing practices, Commerce stated. "British customers, especially in the government and financial sectors where they expect to keep equipment for its full lifespan, have traditionally preferred to purchase computers and related equipment outright," it said, noting over 50% of the acquisitions in 1974 were purchased directly.

Commerce added that the use of mixed systems is becoming increasingly common. It observed that "Britain's giant computer producer, International Computer Ltd. (ICL), has traditionally taken a strong line against CPU linkage with any equipment not produced by the parent company or its subsidiaries.

"However, as the firm produces increasingly sophisticated equipment, with multipurpose functions, trade sources anticipate ICL will relax its policy."

U.S. Dominates

Directly and through their UK and European affiliates, U.S. manufacturers dominate the British market for computer and peripheral equipment, Commerce remarked. As of the beginning of 1975, U.S.-owned companies had supplied 67%, by value, of the installed computer base.

That same year, 65% of total imported DP equipment — including 92% of minicomputers; 62% of small/medium/large computer systems and 53% of peripherals — was purchased directly from the U.S., it estimated.

Sales of U.S.-made equipment are forecast to climb an average 9% annually between 1975 and 1980, rising from $415 million to $635 million, it added.

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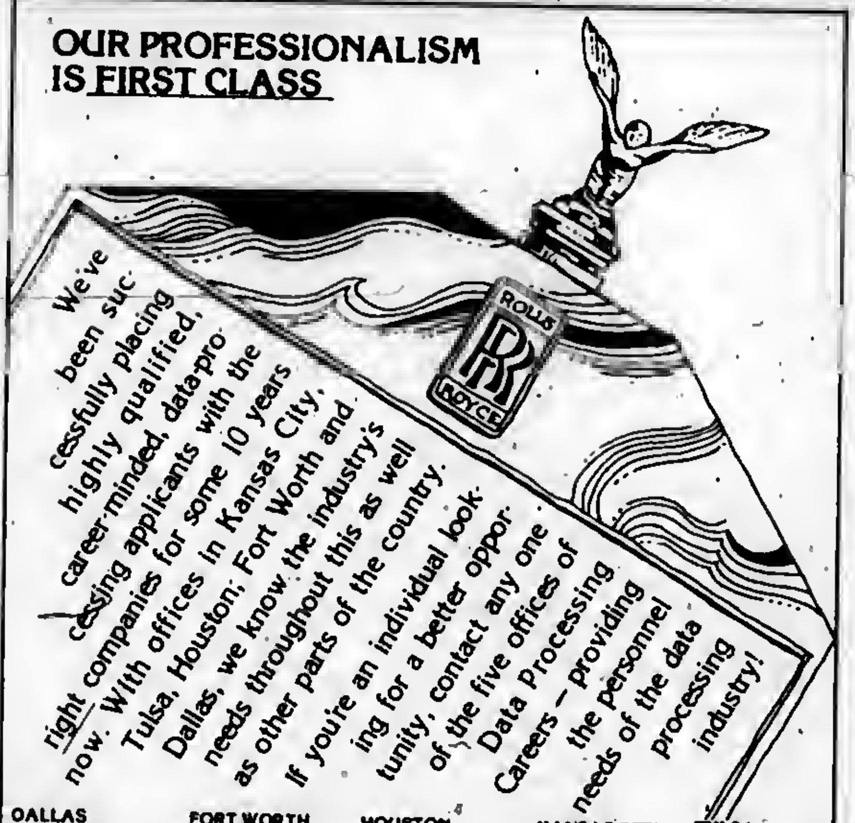

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Take a career jump into the TI minicomputer software team. Duties will include the design and development of extensive systems level diagnostics software for 990 computers in a stand-alone and real-time environment. Excellent knowledge of assembly language programming, diagnostic software and digital logic design required. BSEE with computer science background and 3-7 years' related experience.

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A real opportunity to conduct market analysis and definition for minicomputers and intelligent terminals. Duties will expand to include writing new product marketability specifications, preparing business plans, competitive analysis and making pricing recommendations. Also, responsibilities will include some sales training regarding market analysis and new product strategies. Requires comprehensive knowledge of intelligent terminal/minicomputer business with related experience in product planning. Requires BS/MS in Computer Science with BA/MBA or related business experience.

Marketing Applications Engineers

Work in the forefront of new product development at TI. Duties include analysis of customer requirements and systems design. Direct daily communications in advising and counseling current and potential customers in TI's new distributed processing product lines. Individual will also develop demonstration packages and provide general technical and new product support. Software background, knowledge of digital communications and 3-7 years of directly related experience required as well as BSEE, Computer Science or related technical degree.

Product Planner

Duties would include product/marketing analysis for specific opportunities, conducting competitive analysis, developing specific marketability specifications and communications to management. Requires a BS in Engineering with an MBA preferred, and 4-7 years' experience with 2-5 years in the minicomputer or data processing industry.

Product Services Engineers

A career development opportunity in the support of new computer products from conception to field maturity. Duties will require coordination of service planning-maintenance philosophy, spares requirements, tooling, RMR, training and field installation and sustaining product until field and product reach service maturity by product and/or by account. Similar responsibility will include policy development for product maintainability, serviceability and test design. BSEE with a minimum of 2 years of design or sustaining of minicomputers or related peripherals.

Technical Writers

Experienced digital hardware and software technical writers are needed to join in the development of TI's rapidly growing minicomputer business. Electrical Engineers and computer programmers with good writing skills should also apply.

Send resume in complete confidence to: **Lee Cooke, Staffing Manager/P. O. Box 2909, M.S. 2106/Austin, TX 78769.**

TEXAS INSTRUMENTS
INCORPORATED
An equal opportunity employer M/F

PROGRAMMER ANALYST
Who Want Challenge and Location

You are the person we are looking for if you want diversification (financial, engineering, manufacturing and business) and a true professional challenge (working on the leading edge of the state-of-the-art) in the beautiful surroundings of New Hampshire. You will be using a 370/158 OS/VS with IMS, TSO and will need good communications skills and expertise in COBOL, PL/1, BAL, FORTRAN, etc.

We need Programmer Analysts with 2-4 years IMS (batch and on-line) experience in the following areas:

- manufacturing systems (using IMS, BMP, CSMS, etc.)
- financial systems
- industrial relations/payroll

A degree in Computer or Hard Science or BS/BA is required with an MS or MBA preferred.

Call (603) 885-2881 or send your resume in complete confidence to Mr. A.O. Whitworth, Sanders Associates, Inc., D.W. Highway South, Nashua, N.H. 03061.

Sanders Associates is an equal employment opportunity and an affirmative action employer.

SA SANDERS ASSOCIATES, INC.

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Crown American Corporation, owner/developer of Regional Shopping Centers has an opening in the Utilities Division for a Manager to plan, coordinate and analyze present and planned utility distribution systems.

The successful candidate will be familiar with utility rate schedules and tariff policies. In addition, familiarity with energy conservation systems is helpful, as well as digital computer hardware, system software, data acquisition equipment, man/machine interface techniques, and APL programming language.

Please send detailed reses including salary history in confidence to:

Manager, Personnel
CROWN MEDICAL CORP.
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SYSTEMS ANALYST

Large mfg co needs expertise in order entry, sales forecasting, sales analysis + marketing systems. COBOL bkrnd a strong plus. BS. $19,000 (Fee Paid) . . Contact P. Siegel.

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(716) 842-0801

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Analysts International Corporation is a leader in the rapidly expanding software services industry specializing in the analysis, design, programming and implementation of systems for industry and government across the nation.

Our Detroit and Philadelphia branches are seeking individuals with a minimum of 3 years experience in either COBOL or PL/1. Knowledge of FORTRAN, ALC, IMS, DMS, TOTAL or CICS is a plus.

We can offer an excellent salary and benefit program including fully paid medical insurance.

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AiC

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BANKING ANALYSTS
MICN CPCS: CO Project Mgr., Trust Analyst - many openings. to $22K

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405-525-8833

EDP Professionals

- **Internat Consultants (2)** $33,000
Major NY Bank seeks 2 Senior Systems Analysts with excellent OS/VS applications' systems development exp. Strong project management & interpersonal skills. On-line systems exp required.
- **Msr Business Sys Analysis** $38,000
Multi division Financial Services Firm has position open for systems development pro with excellent analytical & conceptual skills to head up systems planning effort. MBA required (prefer finance). Very visible, growth-oriented position.
- **Msmt Consultants** $25-40's
MAS Division of CPA firm presently recruiting for candidates with heavy experience in one of the following: large scale T/P systems, Data Base systems design, hardware & software performance measurement.
- **Director-Data Base** $39,500
NY based Financial Firm with multiple data centers seeks individual with min 5 years data base design experience to head up company-wide data base effort. Candidate must have excellent IMS, DB-OC & 2 yrs management experience.
- **Project Leader** $26,000
NY Bank has position open for Senior Prog Analyst to take charge of systems effort presently in the development stage. Individual must have solid systems design experience & excellent OS/VS COBOL Prog bkgd-official position. 4 Weeks Vacation.

For Information on these & other career positions, please call or send letter/resume in confidence to:

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Assistant Director will be responsible for coordinating, implementing, and maintaining information system and procedure projects for the Chicago Urban Skills Institute.

Minimum of five years' experience in data processing with at least two years designing large information systems. Experience with mini-computers, data base and on-line systems a plus. Bachelors degree or equivalent background required.

Excellent fringe benefits. Salary commensurate with experience.

Send resume in confidence to:
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180 North Michigan Ave.
12th Floor
Chicago, IL 60601
EOE/AAE

CSC

COMPUTER
SYSTEMS PROGRAMMER/ANALYSTS

TECHNICAL SUPPORT ANALYST

The Information Network (INFONET) Division of Computer Sciences Corporation has en immediate requirement for a proven professional to provide systems and customer support on an operational remote computing network at our Washington, D.C. Center.

The selected individual will have at least 4 years experience in Assemble language and FORTRAN, a system or timesharing background, and experience on UNIVAC 1108 is desireble. Degree in Computer Science a plus.

CSC offers an excellent salary and a full range of company paid benefits.

For immediate consideration, please call or write:

Mr. Angelo Gravagna
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MKSAC DP-1
Infonet Division
11700 Infonet Drive
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Salary to $25,000

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FACULTY POSITION IN COMPUTER SCIENCE

available beginning in January, 1978. Faculty rank; salary; OOE/QUALS. Duties include undergraduate instruction in systems programming, computer architecture and business systems analysis as well as curriculum development. Minimum educational requirement is a Master's degree in Computer Science. Industrial experience preferred. Please send resume (including references) by November 15, 1977 to: Robert S. Shaak, Chairperson, Oepartment of Mathematics and Computer Science, Millersville State College, Millersville, PA 17551. Millersville State College is an Equal Opportunity/Affirmative Action Employer.

SYSTEMS AND PROGRAMMING SUPERVISOR

Challenging opportunity to utilize your professional and managerial ability to a top Fortune 40 Company at one of it's manufacturing facilities located in Central Ohio.

Previous supervisory experience required coupled with demonstrated managerial capabilities in manufacturing and financial systems. Degree preferred. Equipment consists of IBM 360/30 and 370/168.

Excellent growth potential, salary in the 21-23K range, superior fringe benefit program. Interested applicants should forward their resumes with current salary in confidence to:

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Digital's Educational Services Group was the answer for Judy...

and it could be the answer for you.

If you're looking for a place where you can combine your technical expertise and interpersonal communications skills — a place that is both receptive and rewarding — consider Judy's experience.

Judy wanted the opportunity to utilize the full range of her abilities. And she found it within Digital's Educational Services Group.

We offered her an environment that encourages initiative, increased responsibility, and professional advancement while providing the opportunity to work at the vanguard of computer technology. Judy came to Digital as an Instructor, has been promoted every year, and is now a Manager for Software Course Development with one of the largest training organizations in the computer industry. Her primary responsibility is for the definition and development of all training for new products, both present and future, but as Judy says, "you always have the opportunity to take on new responsibilities and to explore new areas."

Digital's Educational Services Group was the answer for Judy . . . and it could be the answer for you!

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Course Developers

We currently need individuals to determine and develop a broad range of advanced software instructional course material required for the support of both current and future products.

You'll be involved in state-of-the-art projects in the early stages, working directly with Engineering on product development and then writing the preliminary objectives, outlines, and tests necessary to instruct others about these products. You'll provide all technical information to the individuals — finalizing their instructional courses, conducting seminars, and aiding in the certification of instructors. In addition, you'll be responsible for reviewing and evaluating the technical content of all documents pertinent to the projects.

If you have a background in Systems Analysis, Systems Programming, Operating Systems Support, Data Base Management, or Software Course Development and Teaching, we would like you to consider this unique opportunity to broaden your technical background while communicating your expertise.

You'll be involved in the following areas of technology:

- Data Base Management
- Data Communications
- Commercial Applications
- Computer Networks
- Operating Systems
  (DOS, IAS, RSTS, RSX-11, RSX-20F, RT-11, TOPS-10, TOPS-20)
- Programming Languages
  (ALGOL, APL, ASSEMBLY, BASIC, BLISS, COBOL, DIBOL, FOCAL, FORTRAN, RPG)

We're located in Digital's Corporate Headquarters in Maynard, Massachusetts, a residential community approximately 25 miles west of Boston. A few of these positions will be relocating to New Hampshire. Additional positions are available for Software Instructors.

Please forward your resume including salary history and requirements to Mary Ann Joyce, Digital Equipment Corporation, Dept K103, 162 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

We're the company looking for people.

DATA PROCESSING CAREER WEEKEND

PROGRAMMERS
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BOSTON

If you are a Programmer; Programmer/Analyst, or Systems Analyst, you now have the opportunity to meet with as many as 20 nationally known "Blue Chip" companies one at a time. Weeks of searching accomplished on one weekend without taking any time off from your present position. There are no fees of any kind. To arrange interviews send your resume with present salary to: **SEARCH E.D.P., INC.**

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Proj. Lead.	to $23K
Sr. EOP Auditor	to $23K
Sr. Sys. Anal.	$17 to 23K
Mini Anal.	to $25K
On-Line Anal.	to $25K

Current employment will be protect. Send resumes including salary and location preference to:

Jim Staal, Manager, Information Systems Division or Frank Parks, Banking/Insurance EOP Consultant

Whitlow & Associates
3390 Peachtree Road, N.E.
Suite 438
Atlanta, Ga. 30326
Telephone (404) 262-2566

PRODUCT LINE SALES MANAGER

Continental Peripherals has immediate need for a Product Line Sales Manager experienced in memories, disk drives and printers. This is an outstanding opportunity with a listed company, multimillion sales, national/international operation.

The person we are seeking will have a proven record of accomplishment in technical sales management.

For a confidential interview call or send your resume including salary history to: Judy La Brie, **CONTINENTAL PERIPHERALS**, 175 Middlesex Turnpike, Bedford, MA 01730 (617) 275-0850.

CP **Continental Peripherals**
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Mini-Resume
Digital Equipment Corporation

Name____________________
Address____________________
City__________ State__________ Zip________

Position Desired (check one)

☐ Field Software Support ☐ Home Office Software Support ☐ Software Development

Describe your present position: from:________ to: ________

What's your educational background: ____________________

Phone Number__________ Home __________ Business

With several challenging openings throughout the United States, Digital Equipment Corporation offers the experienced Software Specialist a truly outstanding opportunity to join the world's leading manufacturer of minicomputers.

Today, just 20 years after we opened our doors, we've grown to more than $1 billion in sales.

If this is the kind of growth environment that interests you, then you interest us.

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- Real-time event driven interrupt applications
- Timesharing business applications development
- Program conversion techniques

USE OUR MINI-RESUME FOR QUICK RESPONSE.

Fill out the mini-resume above and mail it to: George Peterman, Dept. H103 3807, 129 Parker Street, Maynard, Massachusetts 01754. We are an equal opportunity employer, m/f.

We're the company looking for people.

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DATA PROCESSING PROFESSIONALS

Due to recent internal expansion, Lennox Industries Inc., a nationally recognized leader in the heating and air conditioning field, has positions available for Systems Analysts, Senior Applications Programmers and Applications Programmers.

Processing environment is a 370/158 under OS/VS1 providing real time and batch teleprocessing services for many locations throughout the United States and Canada.

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Please submit a resume which includes salary history to:

John Dugan
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DEC

Systems Programmer

Come to the land of opportunity!

FORDHAM UNIVERSITY is looking for DECsystem 10-20 systems programmers. This is a fine opportunity for someone with an academic bent who is looking for a challenging position.

For more details contact
Mr. Joseph Middleton
Mgr. of Academic Services
Computing Center
Fordham University
Bronx, N.Y.
(212) 933-2233

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We're a specialized recruiting firm offering national coverage. Our clients are fortune 500 companies + smaller regional firms. Our Company Clients pay our fees plus interview, relocation and temporary living expenses. Of 182 firms like ours, we came in 2nd in the U.S. in 1976 in terms of placements and production. If you're even thinking about looking for a better position, you can't afford not to let us help. Here's a sample of current openings:

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Ask for our new free booklet on effective resume preparation

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At Marlboro, We Think

Large...

Digital in Marlboro, Massachusetts is the home of our Large Computer Group (DECsystem 10, DECSYSTEM 20).

We emphasize individual commitment and accomplishment. Here, dedicated professionals have the autonomy to explore the boundaries of computer development, with support readily given to their projects and recognition given to their achievements. If you are seeking a highly professional environment that truly encourages independent creativity, its waiting for you at Digital in Marlboro.

Operating Systems

Supervisor-Software Development

A position of high visibility exists for a truly creative individual to supervise a project team in the development of a highly advanced Batch system designed to interface with Digital's DECsystem 10 and DECSYSTEM 20.

The qualified candidate will have a BS degree in a technical discipline or equivalent with two or more years of supervisory experience. Software development experience of large scale systems is necessary.

Senior Software Engineers

If you enjoy working in a group of highly professional and motivated individuals, you will be interested in the opportunities that exist in our TOPS-20 monitor group to development enhancements to a large scale, state-of-the-art, timesharing system.

If you have 3-5 years experience in assembly language programming on large systems, this could be the chance you've been waiting for to utilize your skills in a challenging environment. A BS degree in Computer Science or equivalent is preferred.

Language Products

Senior Software Engineers

If your working vocabulary includes languages such as APL, MACRO-10 or BLISS, plus compiler development experience, and you're tired of bit pushing in assembly code, we have exciting opportunities for you.

We're looking for people to join an expanding development team producing language processors for Digital's mainframe computers. BLISS and Interactive development tools are being used to produce high quality sophisticated and timely language products for the system which is the industry's leader in timesharing.

You'll need 2-5 years experience designing and implementing compilers and language I/O systems. A degree in Computer Science or the equivalent, plus project leadership experience is preferred. Opportunities also exist in our Commercial Software group to work on a data base management system for the DECsystem 10 and DECSYSTEM 20. The successful candidate will have knowledge of DBMS applications and assembly language systems programming. A BS degree or equivalent is preferred.

Computer Services

Senior Software Support Specialist

We currently have career opportunities for "hands-on" doers who are performance oriented to provide technical support for our in-house marketing and development data centers. Responsibilities include developing simulator software for our DECsystem 10's and DECSYSTEM 20's and network and communications support for these systems.

The successful candidates will have 3-5 years experience in assembly language programming and in System or Software support. A BS degree in Computer Science or equivalent is desirable.

The challenge and opportunities you've been looking for are waiting for you at Digital in Marlboro. Please forward your resume including salary requirements and indicating area of interest to Carol A. Reed, Digital Equipment Corporation, 200 Forest Street, Marlboro, Massachusetts 01752. We are an equal opportunity employer m/f.

We're the company looking for people.

digital

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come GROW with us

Continuing growth of our Group demands the addition of two more people to our Data Processing staff. If you have the following qualities - YOU may be the person we need !

Programmer Analyst:
With three years of broad property-casualty experience to analyze a variety of areas. A COBOL, DOS/VS background helpful.

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Need three years experience in life insurance systems design and installation. Package installation skills helpful. Applicant should have strong programming, user liaison, and analysis skills, and a BAL orientation on IBM equipment.

We offer competitive salaries and a modern benefits package.

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DATA BASE MANAGER

Oakland Unified
School District
Salary:
$1,617-$2,063 per month

Any combination equivalent to graduation from college in accounting, business, computer science, mathematics, statistics, industrial engineering, other related field; and four or more years of experience in systems analysis, design, programming and/or software analysis including two or more years of experience in the design, development, control, and management of data bases.

Excellent fringe benefits, including fully paid health, dental and life insurance plans. Excellent retirement plan.

Apply Oakland Unified School District, Office of Classified Personnel, 1025-2nd Avenue, Room 230, Oakland, CA 94606 (415) 836-2622, Ext. 556. Deadline for applying October 7, 1977

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If you've thought about changing jobs and would like to know what's available, call or write Jack Edwards to discuss your options.

Jack's only specialty is insurance data processing. He is a FLMI and has held management and consulting positions in the insurance industry for 19 years.

Client companies currently have openings in programming, analysis, consulting and management. Salary ranges from $15,000-$28,000, and locations include New England, Middle Atlantic, Southeast and Midwest.

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PROGRAMMERS AND ANALYSTS

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Our individualized search will provide you with local or national exposure depending on your geographical preference.
If you have at least 2 years experience in programming send your updated resume, geographical preference and salary requirements in strictest confidence to:

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DALLAS, TEXAS 75243

SEARCH E.D.P., INC.
SUITE 25, 3181 LINWOOD AVE
CINCINNATI, OHIO 45208

STANLEY

SUPERVISOR COMPUTER OPERATIONS

The Stanley Works Corporate Data Center has a requirement for a competent data processing professional to manage its computer operations. The succesful candidate will have a college degree and will be experienced in the direction of day-to-day operations of a large-scale computer, processing a complex mix of batch and teleprocessing applications. This position demands communicative and supervisory skills and has significant growth potential.

Send resume with salary history to:

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STANLEY

Field Engineering Specialists

Amdahl Corporation has earned an international reputation as builder of the most advanced large computer system. Since our first shipment two years ago, we have delivered a quarter of a billion dollars worth of computers to the world's major companies and institutions. The company is exciting, the environment stimulating, and our compensation and benefits are excellent.

We seek Field Engineering Specialists who have a minimum of 5 years' experience in maintaining large-scale systems with in-depth training on compatible CPUs. You will have company support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. You will have the opportunity to work with multiple customers, to guide and support field engineers and to use your technical expertise for your own personal development and the growth of the Amdahl Corporation. Openings exist at Amdahl headquarters in California and temporary assignments are available in the Far East with a permanent assignment following. Please indicate 580-E on your response and direct it to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

amdahl

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sales engineers

The odds are in your favor with Sperry Univac!

Mini's with advantage. The V-77 series of mini-computers; a fast, powerful trio that cover a broad spectrum of the marketplace, from scientific to data communications. They're a well structured family that offer a sales engineer with a need for success: Versatility, compatibility, price and performance. A mini-computer family you'll be proud to sell. In fact, we're so sure of the V-77's performance that we're dedicated to doubling our sales this year.

To accomplish this we need hard working, dedicated sales professionals with a minimum of 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed Processing marketplace AND technical competence in hardware and software. In addition, you must have a record as a closer who maintains account relationships, one who gets new and repeat business.

What can you expect from us: For starters, one of the best incentive plans the industry has to offer, and second a real opportunity to develop your career, both for the short term and the long term. The odds really are in your favor with us.

For openings in Chicago, Dayton, Detroit, Philadelphia, New Jersey, New York (Manhattan), Atlanta, Orlando and Washington, D.C. please call Gerry Goerlitz collect at 215/542-5254 or send your resume to B301M, P.O. Box 500, Blue Bell, Pa. 19422.

For openings in Dallas, Houston, Los Angeles, San Francisco or Seattle, please call Gary Montgomery, collect at 714/833-2400 or send your resume to 2722 Michelson Drive, Irvine, Ca. 92713.

SPERRY UNIVAC
COMPUTER SYSTEMS

To investigate other openings with Sperry Univac, please direct your resume to
P.O. Box C19504, Irvine, Ca. 92713

Equal Opportunity Employer M/F

DATA PROCESSING POSITIONS in FLORIDA

The Computer Systems Division of Harris Corporation is a part of the fast growing Fort Lauderdale community. Our medium scale digital computers now rank among the nation's finest digital computer systems available on the marketplace today.

YOU can find your place in the sun in our divisional headquarters if you qualify for one of the opportunities listed below.

SENIOR SOFTWARE TECHNICAL WRITER

A challenging position for the qualified candidate who can research, write and edit reference and user software manuals; direct a small group of software writers; interface effectively with system software analysts and publications personnel. The successful candidate will have at least 2 years' experience in software technical writing, an English degree or computer science and a broad range of programming experience.

OPERATING SYSTEM and COMPILER SOFTWARE ANALYST

If you wish to work with state-of-the-art operating systems and compiler software, our Computer Systems Division is the place for you. A solid education and previous experience in operating systems or compiler design coupled with assembly language programming will qualify you as a candidate.

INSTRUCTORS

Hardware and software instructor positions are available for individuals with 3-5 years' experience in either hardcore course preparation and classroom instruction. Occasional travel is required. We seek candidates with a degree in computer science, math or other equivalents.

FIELD ANALYSTS

Several positions within the marketing organization are available. We expect applicants to possess a minimum of expertise in FORTRAN and COBOL, operating systems and sensitivity to customer problems.

FIELD SERVICE ENGINEERS

We prefer individuals with heavy exposure to pre and post installation problems. A thorough knowledge of electronics, especially CPU's, disc drives and other peripherals will be necessary for successful customer support.

HARRIS has several other growth oriented positions available in the field and at Fort Lauderdale. These positions are in the following disciplines:

DESIGN ENGINEERS
SOFTWARE DEVELOPMENT
TECHNICAL WRITERS
SALES PERSONNEL
PRODUCT SPECIALISTS
CONTRACTS ADMINISTRATORS
ACCOUNTING MANAGEMENT

If you are a data processing professional and feel that you would like to make a change with a fast growing Fortune 500 company such as Harris, we would appreciate you taking the time to complete and clip out the information requested below. This will be held in the strictest confidence.

I am interested in the following areas:

__Software Development
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__Quality Control
__Sales
__Engineering Design & Development

__Field Service Support
__Field Analyst Support
__Accounting & Administration
__Personnel

NAME ______________________________

ADDRESS ______________________________

CITY ____________ STATE __________ ZIP ________

__ Enclosed is my personal resume for your convenience.

Attn: W.D. Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

Data Processing **ANALYSTS/PROGRAMMERS**

BUSINESS SYSTEMS

Major retail organization in Northern Virginia continues to expand its data processing services and has opportunities in the development and support of business systems in tha Financial, Operating and Marketing functions of a growing corporation with an excellent track record.

ANALYST/PRDGRAMMER

Openings for senior personnel and personnel with 1-2 years experience in the design and implementation of financial, inventory control and payroll applications in an IBM DOS/VS environment using COBOL.

SYSTEM PRDGRAMMER

Requires experience in an IBM 370 DDS/VS POWER communications environment. Must possess ability to grow end lead the development of an expanding communications environment.

These are outstanding growth opportunitias. Send resume including salary history in strict confidence to:

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DC

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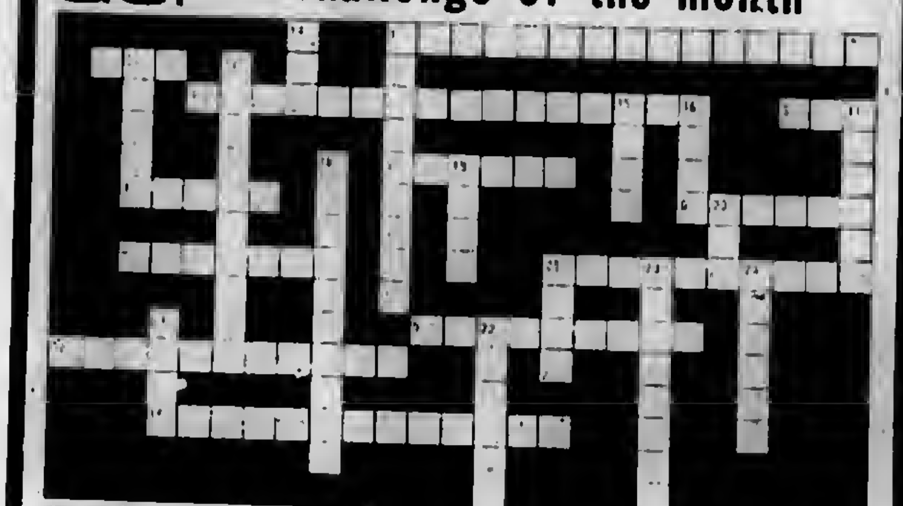
aci **Challenge of the month**



ACROSS

1. The snowball problem
2. The grim, gray giant
3. Data management software. (2 correct answers)
4. Capability of making more than one mistake at a time
5. Physical storage cycle
6. Put in machine readable format
7. Common business oriented language
8. Message switching
9. Collection of cryptic, graphic symbols
10. Double-octal
11. Everyone advocates it, no one does it
25. Transformation

DOWN

1. Caller's argument
12. Dartmouth languaga
13. Funcational module
14. The increment by which programmers slowly go mad
15. List memoer
16. Programmer reaction when it runs right the first time
17. Device to keep bugs out
18. Sequence of instruction
19. Place where all garbage ends up
20. Started with cash registers
21. BPS
22. The opposite of batch
23. Non-constant
24. Table look up
25. Customer information control system

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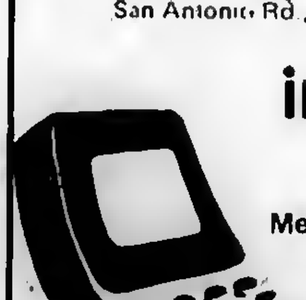

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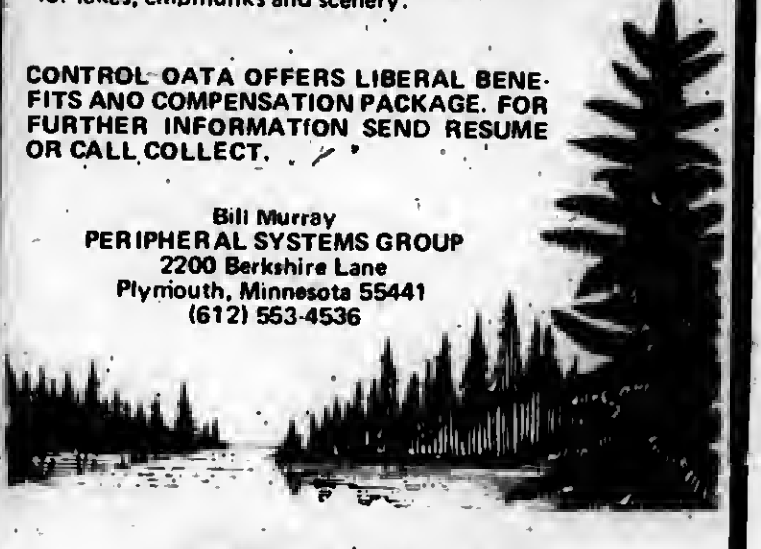

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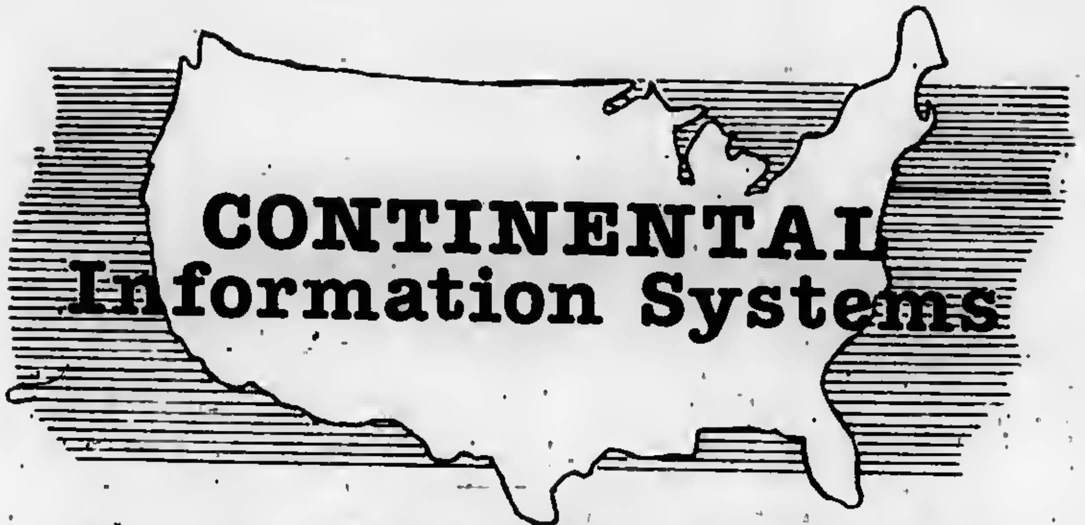

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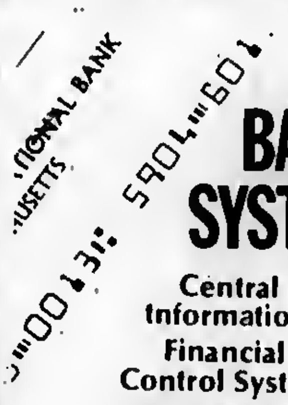

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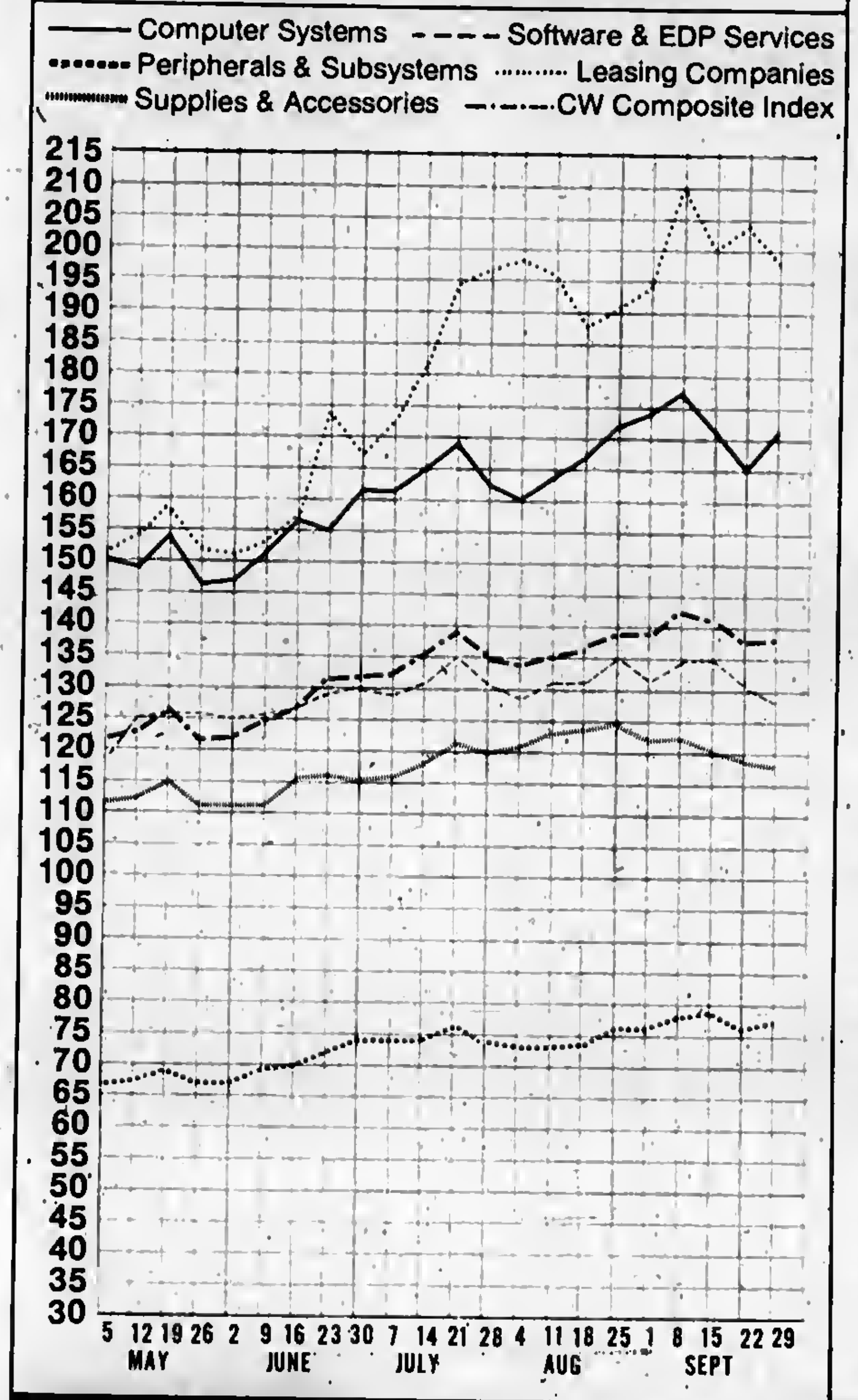

Earnings Reports

INTERSIL
Three Months Ended June 28

	1977	a 1978
Shr Ernd	$.20	$.01
Revenue	20,635,000	18,777,000
Earnings	1,088,000	50,000
9 Mo Shr	.77	.40
Revenue	60,953,000	52,284,000
Tax Cred	1,253,000	642,000
Earnings	4,144,000	2,065,000

a-Restated to reflect combined results of merger of Advanced Memory Systems in November 1978.

ITEL
Three Months Ended June 30

	1977	1978
Shr Ernd	$.55	$.40
Revenue	85,400,000	64,500,000
Earnings	5,700,000	3,400,000
6 Mo Shr	1.09	.73
Revenue	164,000,000	121,700,000
Earnings	11,300,000	8,200,000

KEANE ASSOCIATES
Three Months Ended June 30

	1977	1978
Shr Ernd	$.12	$.12
Revenue	1,810,000	1,396,000
Earnings	96,000	104,000
6 Mo Shr	.24	.18
Revenue	3,456,000	2,675,000
Earnings	191,000	150,000

LEAR SIEGLER
Year Ended June 30

	1977	1978
Shr Ernd	$2.22	$1.52
Revenue	920,285,000	694,307,000
Earnings	37,055,000	25,412,000
3 Mo Shr	.83	.59
Revenue	293,238,000	192,289,000
Earnings	13,898,000	9,880,000

e-Includes results of Royal Industries, Inc. since Jan. 1.

INTEL
Three Months Ended June 30

	1977	1976
Shr Ernd	$.75	$.52
Revenue	a69,222,000	50,624,000
Earnings	7,963,000	5,504,000
6 Mo Shr	1.44	.99
Revenue	e134,948,000	96,108,000
Earnings	15,288,000	10,507,000

e-Includes approximately $900,000 in proceeds from business interruption insurance.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 28, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE SEP 28 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	44	+6	+15.7
N	BURROUGHS CORP	55- 91	68 3/4	+1 3/8	+2.0
O	COMPUTER AUTOMATION	18- 30	24 1/2	+1	+4.2
N	CONTROL DATA CORP	20- 26	19 5/8	+ 1/8	+0.6
O	CRAY RESEARCH INC	15- 29	25 3/4	+1 1/4	+5.1
N	DATA GENERAL CORP	35- 51	48 1/2	+2 1/4	+4.8
N	DATAPOINT CORP	18- 32	29 7/8	+ 3/8	+1.2
N	DIGITAL EQUIPMENT	37- 53	47 1/2	+2 3/8	+5.2
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	10 1/2	- 1/2	-4.5
O	FOUR-PHASE SYSTEMS	13- 19	18 1/4	+1 3/8	+8.1
N	FOXBORO	42- 54	44 1/4	+ 1/4	+0.5
O	GENERAL AUTOMATION	6- 9	6 1/2	+ 3/8	+6.1
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	78	+1 1/4	+1.6
N	HONEYWELL INC	44- 55	45 3/8	+ 7/8	+1.9
N	IBM	245-286	259 1/2	+3 1/4	+1.2
O	MANAGEMENT ASSIST	5- 9	8	+ 1/2	+6.6
O	MEMOREX	23- 34	30 7/8	+ 3/8	+1.2
O	MICRODATA CORP	7- 18	12 1/4	+ 1/2	+4.2
O	MODULAR COMPUTER SYS	5- 8	6 3/4	+ 5/8	+10.2
N	NCR	32- 47	46 1/2	+2 3/8	+5.3
O	PRIME COMPUTER INC	12- 23	20 3/4	+3	+16.9
N	PERKIN-ELMER	17- 22	20	+ 1/2	+2.5
N	RAYTHEON CO	16- 33	29 3/4	0	0.0
N	SPERRY RAND	33- 42	33 1/2	0	0.0
O	SYCOR INC	8- 15	11 7/8	- 3/8	-3.0
A	SYSTEMS ENG. LABS	5- 8	6 7/8	+ 1/4	+3.7
A	WANG LABS.	10- 14	12 1/8	- 1/4	-2.0

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE SEP 28 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 7/8	- 1/8	-2.5
O	BOOTHE COURIER CORP	8- 10	10	- 1/4	-2.4
O	COMDISCO INC	10- 13	12 1/4	- 1/2	-3.9
A	COMMERCE GROUP CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	0	0.0
N	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	1 7/8	- 1/8	-6.2
N	DPF INC	6- 9	9 1/8	+ 1/8	+1.3
N	ITEL	13- 22	21	+1 1/8	+5.6
N	LEASCO CORP	19- 27	23 3/8	+ 3/4	+3.3
O	LEASPAC CORP	1- 2	1 1/4	- 1/2	-28.5
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	0	0.0
N	U.S. LEASING	10- 15	12 3/4	- 3/8	-2.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE SEP 28 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	5/8	- 1/4	-28.5
O	ANACOMP INC	7- 10	8 1/4	0	0.0
A	APPLIED DATA RES.	5- 10	7 1/2	+ 1/8	+1.6
N	AUTOMATIC DATA PROC	23- 30	26 1/8	+ 7/8	+3.4
O	COLEMAN AMERICAN COS	2- 2	2 1/8	0	0.0
O	COMPU-SERV NETWORK	10- 15	11 1/2	-1	-8.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/2	+ 3/4	+7.6
N	COMPUTER SCIENCES	7- 9	8 1/4	+ 1/4	+3.1
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 1/4	- 1/8	-9.0
O	COMSHARE	5- 8	7	- 1/4	-3.4
O	DATA DIMENSIONS INC	3- 5	3 1/8	- 1/4	-7.4
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	15 1/2	-1 1/2	-8.8
O	INSYTE CORP	2- 3	1 3/4	+ 1/8	+7.6
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	- 1/8	-3.1
O	KEYDATA CORP	2- 3	1 3/4	- 1/4	-12.5
A	LOGICON	7- 17	11 1/8	-1 1/8	-9.1
A	MANAGEMENT DATA	1- 2	1 3/4	+ 1/4	+16.6
A	NATIONAL CSS INC	19- 26	25 1/8	+1 1/8	+4.6
O	NATIONAL DATA CORP	4- 7	4 7/8	+ 3/8	+5.7
A	ON LINE SYSTEMS INC	16- 22	16 3/8	+ 1/8	+0.7
N	PLANNING RESEARCH	3- 6	4 7/8	- 1/8	-2.5
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 3	2 3/8	- 1/8	-5.0
O	REYNOLDS & REYNOLDS	17- 20	18 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	1- 4	3 7/8	- 5/8	-13.8
O	TYMSHARE INC	14- 23	18 1/2	-1 1/2	-7.5
A	URS SYSTEMS	4- 5	4	- 1/4	-5.8
N	WYLY CORP	1- 2	3/4	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE SEP 28 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/2	- 1/8	-0.9
O	ADVANCED MEMORY SYS	7- 9	6 7/8	- 1/4	-3.5
N	AMPEX CORP	8- 11	10	0	0.0
O	ANDERSON JACOBSON	3- 5	3 3/8	- 1/8	-3.5
N	APPLIED DIG DATA SYS	10- 20	13 1/2	- 3/4	-5.2
O	BEEHIVE INT'L	8- 12	9 1/2	0	0.0
A	BOLT.BERANEK & NEW	7- 9	8 5/8	- 1/8	-1.4
N	BUNKER-RAMO	8- 12	10 3/8	- 3/8	-3.4
A	CALCOMP	3- 5	3	- 1/8	-4.0
O	CAMBRIDGE MEMORIES	1- 4	3 1/4	- 5/8	-16.1
N	CENTRONICS DATA COMP	22- 30	27 1/4	- 1/2	-1.8
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 8	7	+ 1/8	+1.8
O	COMPUTER CONSOLES	4- 7	4	- 1/4	-5.8
A	COMPUTER EQUIPMENT	2- 3	3 1/8	+ 1/8	+4.1
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	10 1/2	+ 3/8	+3.7
N	CONRAC CORP	19- 28	21	- 1/2	-2.3
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 1/8	- 1/2	-6.5
A	DATA PRODUCTS CORP	9- 16	14 7/8	+ 3/8	+2.5
O	DATA TECHNOLOGY	3- 4	4	- 1/4	-5.8
O	DATUM INC	1- 2	2 1/8	0	0.0
O	DECISION DATA COMPUT	2- 3	2 1/8	- 1/8	-5.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	6 7/8	- 1/4	-3.5
O	DATARAM CORP	2- 11	10 3/4	+3 1/4	+43.3
N	ELECTRONIC M & M	4- 5	3 7/8	+ 1/8	+3.3
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/8	-10.0
N	HAZELTINE CORP	9- 12	8 1/2	0	0.0
N	HARRIS CORP	28- 39	37 1/2	+1 1/4	+5.4
A	INCOTERM CORP	10- 15	13	+1 1/2	+13.0
O	INFOREX INC	4- 7	4 3/8	0	0.0
O	INFORMATION INTL INC	9- 14	11	+ 3/4	+7.3
O	INTEL CORP	38- 57	49 1/2	+4	+8.7
A	LUNDY ELECTRONICS	3- 6	4 1/4	+ 1/2	+13.3
O	MSI DATA CORP	6- 13	12 1/2	+1 1/4	+11.1
N	MOHAWK DATA SCI	5- 8	5 7/8	+ 3/8	+6.8
O	PENRIL CORP	2- 5	4 1/8	+ 1/8	+3.1
A	PERTEC CORP	7- 9	8 1/4	+ 3/8	+4.7
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 3/4	+ 1/8	+3.4
O	RECOGNITION EQUIP	6- 10	7 3/4	- 1/4	-3.1
O	SCAN DATA	1- 2	1 1/8	0	0.0
O	STORAGE TECHNOLOGY	10- 18	17 1/2	+ 5/8	+3.7
O	T BAR INC	7- 13	12 3/4	0	0.0
O	TALLY CORP.	4- 6	4 1/4	+ 1/8	+3.0
A	TEC INC	7- 10	7 1/2	0	0.0
N	TEKTRONIX INC	29- 38	37 1/8	+1 1/8	+3.1
N	TELEX	2- 3	2 5/8	- 1/8	-4.5
O	WILTEK INC	1- 1	3/4	+ 1/8	+20.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE SEP 28 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 1/4	- 1/8	-1.9
O	BALTIMORE BUS FORMS	2- 4	1 5/8	0	0.0
A	BARRY WRIGHT	10- 14	13 1/8	+ 1/2	+3.9
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 1/8	- 1/2	-2.8
N	ENNIS BUS. FORMS	6- 7	6	- 1/8	-2.0
O	GRAHAM MAGNETICS	11- 17	17	0	0.0
O	GRAPHIC CONTROLS	14- 18	14 1/4	0	0.0
N	3M COMPANY	48- 56	50	- 1/8	-0.2
O	MOORE CORP LTD	26- 37	26 1/2	- 1/4	-0.9
N	NASHUA CORP	16- 28	27 3/8	+ 5/8	+2.3
O	STANDARD REGISTER	16- 25	19 3/4	- 1/4	-1.2
O	TAB PRODUCTS CO	13- 19	15	- 3/4	-4.7
N	UARCO	19- 22	19 3/4	+ 1/4	+1.2
A	WABASH MAGNETICS	10- 15	11 1/2	- 3/8	-3.1
N	WALLACE BUS FORMS	17- 21	18 1/4	+ 1/4	+1.3

Intel delivers more semiconductor memory than anyone. Even IBM.

When you select a computer, it often makes sense to choose IBM. Because of their size, industry acceptance, installed base and technological leadership in computers.

But when it's time to select a memory supplier for your IBM computer, it always makes sense to choose Intel.

For the same reasons.

Intel is the world's largest supplier of semiconductor memory. Over 53 billion bits shipped in 1976 alone. That's more than IBM has shipped domestically during the life of System 370.

We became number one in semiconductor memory by applying marketing strength to technological leadership. Technological leadership is what you expect from the company that invented the world's first microprocessor. And marketing strength is what you expect from the world's largest supplier of microprocessors and semiconductor memory.

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And we've built an organization to equal — and often surpass — the sales, service, support and confidence you expect from IBM. Intel has over 600 IBM 370 series memories installed at companies like yours.

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Intel is your logical choice for System 370 memory. So whether you're planning a new 370 installation or upgrading existing capability, talk to Intel. Phone us at (408) 734-8102. Or write: Intel Memory Systems, 1302 N. Mathilda Ave., Sunnyvale, CA 94086.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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	370/148	**3031**	370/158	370/158-3	**3032**	370/168	370/168-3	**3033**
ase Price[1]	689,000[5]	**1,455,000[6]**	1,915,200[6]	2,001,100[6]	**2,388,000[6]**	2,884,780[7]	3,103,210[7]	**3,605,000[8]**
ase Price[2]	689,000[9]	**1,455,000**	1,966,965[10]	2,052,865[10]	**2,728,000[11]**	3,581,530[12] 4,105,030[13]	3,838,350[12] 4,388,460[13]	**3,605,000**
Price/Mo[3] (Four-Year Lease)	17,280	**39,310**	55,820	59,600	**58,470[6]** **67,470[11]**	96,384[12] 110,874[13]	107,635[12] 122,629[13]	**77,480**
Maintenance/Mo	2,235	**3,690**	3,189	3,234	**7,110[6]** **7,675[11]**	7,809[12] 9,305[13]	7,970[12] 9,466[13]	**8,320**
Relative CPU Power[4]	23	**52**	46	52	**135**	100	109	**170**
Memory Size in 8yte (Minimum-Maximum)	1M-2M	**2M-6M**	512K-6M	512K-6M	**2M-6M**	1M-8M	1M-8M	**4M-8M**
Memory Cycle Time (Nsec)	405-540	**345-805**	620-1,035	620-1,035	**320**	320	320	**290-464**
Machine Cycle Time (Nsec)	180-270	**115**	115	115	**80**	80	80	**58**
Channels (Minimum-Maximum)	5 Standard	**6 Standard**	3 Standard-6	3 Standard-6	**6 Standard-12**	0-12	0-12	**12 Standard-16**
Price/Channel	8uilt-In	**8uilt-In**	4th-14,970 5th-13,930 6th-7,005	4th-14,970 5th-13,930 6th-7,005	**360,000/6 channels**	Note 14	Note 14	**320,000/4 channels[15]**
Multiprocessor Configurations?	No	**No**	Yes	Yes	**No**	Yes	Yes	**No**
Buffer Capacity	0	**32K**	16K	16K	**32K**	32K	32K	**64K**

1. Includes CPU, power supply, operator's console, memory.
2. All of 1 with channels added.
3. Lease rate based on purchase price in 2.
4. 360/50 = 10. International Data Corp. estimates; CW estimates for 3031, 3032.
5. With 1M-byte memory and standard channels.
6. With 6M-byte memory and standard channels.
7. With 6M-byte memory, the extended channel feature (3855), but no channels.
8. With 6M byte memory, 12 channels standard.
9. Five channels standard.
10. With six channels - three standard, three optional.
11. With 12 channels - six standard, six optional.
12. With six channels, all optional.
13. With 12 channels.
14. The 2870 byte multiplexer channel costs $117,900. The 2880 block multiplexer contains two channels for $174,500.
15. Users must add four channels; choice of four block multiplexers or three block multiplexers and one byte multiplexer.

Faster, Cheaper Than 370s

Two CPUs Stretch IBM 30 Series

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — Huge price reductions but little in the way of new technology marked IBM's announcement last week of the latest members of its 30 series of processors.

The 3031 and 3032 join the 3033 in the new line, which is rapidly obsoleting the intermediate and upper end of the firm's 370 series of computers through a combination of increased performance and cut-rate prices.

The central processors achieve performance gains of over 150% through the increased use of firmware, improved cycle times and four-way memory interleaving, IBM said.

In addition to offering users improved performance, the systems may be aimed at stopping competition from plug-compatible CPUs since they either undercut or match the prices of comparable systems from Amdahl Corp. and Itel Corp., which have been making inroads into the IBM large system domain.

The units announced last week join the 3033 processor announced late last March as the IBM upgrade paths for the now five-year-old 370 series. They will be delivered at the same time as the 3033 — the first quarter of 1978.

The 3031 offers an instruction execution rate that is 2 to 2.5 times the rate of the 370/148, according to IBM, and uses a similar jobstream running under DOS/VS Release 34 or OS/VS1 Release 6.

The system cost is roughly double that of a 148. However, figures developed by *Computerworld* (see chart above) indicate that the 3031 is actually more comparable to the 370/-158-3. CPU power is roughly equivalent to that system — at a price reduction of almost $600,000 for an

(Continued on Page 6)

Workers Want Voice in Data Use

By Ann Dooley
CW Staff

W. LAFAYETTE, Ind. — Ninety-two percent of the employees of five major U.S. corporations would prefer to be consulted before their employers release personal information about them to outside organizations, according to a study published recently by Purdue University's Information Privacy Research Center.

The percentage dropped to 76% when the release of personal information was on an internal level.

The study, which examined the five corporations' actual information policies as well as more than 2,000 employees' perceptions of those policies, found that most employees don't really know how the data in their personnel files is used. Their perceptions varied according to salary, sex and length of time with the company.

Less than half of the respondents believed they were allowed to examine their personal records, while many did not know if they could. Older employees believed more often than any other group that they could examine their files.

Only 14% of those studied had actually examined their files, the study found.

Approximately 44% of the respondents believed they were allowed to correct wrong information; almost one-third indicated they did not know whether they could make corrections.

Nearly one-third of the respondents expressed some amount of dissatisfaction with their employers' handling of personal data. However, when asked whether they had an experience which upset them regarding internal or external release of information, very few said they had, according to the study.

Nearly 43% of the respondents said they thought their employers were doing a good job in protecting their personal privacy, 8% disagreed and 43% said they didn't know.

Those who had actually examined their files were found to have a more accurate knowledge of what was stored, were more satisfied with their employers' practices and believed their employers were doing a good job in

(Continued on Page 4)

Alleged Dog Track Swindle Bilks Bettors of $1 Million

By Jeffry Beeler
CW Staff

MIAMI — Bettors at a local dog track were apparently bilked out of $1 million in legitimate winnings as a result of an alleged swindling scheme involving six men and a computer.

Martin Dardis, chief investigator for State Attorney Richard Gerstein, estimated the suspected conspirators may have been shortchanging trifecta winners at the Flagler Dog Track here for as long as five years.

Suspects in the case include three employees of Automatic Totalisator Co., a supplier of parimutuel betting equipment, and three Flagler workers.

Four of the men have been arrested and charged with grand larceny and conspiracy. A fifth suspect is still at large and the sixth, Automatic Totalisator computer operator Richard Hudson, has agreed to turn state's evidence in return for immunity from prosecution.

Dardis said the suspects swindled "untold hundreds" of bettors by juggling figures from the dog track's two Digital Equipment Corp. PDP-8/Es to show inflated numbers of winning trifecta tickets.

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NEWSPAPER

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At Contu Hearing

Program Copyright Gains Support

By Edith Holmes
CW Staff

CHICAGO — During a hearing of the National Commission on New Technological Uses of Copyrighted Works (Contu) here recently, industry associations lent their weight to the proposal that copyright protection be given to computer programs.

Two organizations, however — the Computer and Business Equipment Manufacturers Association (Cbema) and the Information Industry Association (IIA) — stressed the need for a tighter definition of "computer program" in the law and pointed out the importance of defining "computer."

Contu's Software Subcommittee definition of "computer program" also received criticism from Philip H. Dorn, a consultant and member of the Association for Computing Machinery's (ACM) Legal Issues Committee, who said neither subroutines nor program modules receive adequate protection.

Cbema and IIA officials suggested Contu's proposed definition of "computer program" add the word "indirectly" to read: "A 'computer program' is a literary work that consists of a series of statements or instructions in a form and order intended to be directly or indirectly utilized in a computer to cause it to achieve a certain result through the performance of a series of steps of a process."

Source Programs

The change becomes important because of the way in which a computer reads source programs, Frank H. Cullen, a Cbema member and manager of patent headquarters for Burroughs Corp., explained.

"Many programs are written in source code using a high-level language and that code needs to be compiled into the object code which directly causes a computer to achieve a certain result," he said.

"Such object code may not need to be generated as a collection of statements or instructions; rather it could theoretically be generated and used internally only as needed," Cullen added.

Cbema and the IIA have given their support to the use of copyrights for software program protection, but opponents have had their say, too. Now, with its hearings over, Contu must decide what recommendations it will send to Congress.

Dorn called the software subcommittee's proposal "reasonably good," but identified a "problem with the limits of what is a 'series of instructions.' "

Modules and subroutines are a problem because they don't stand alone. They need other modules or subroutines to operate, Dorn noted.

Because programs "tend to be released in a very immature form," Dorn said copyright protection is also explicitly needed for subroutines.

Not all organizations and individuals agree with Cbema and IIA that computer programs should be protected by copyright.

ACM Disagrees

"Copyright protection would be of little or no use and difficult to enforce," according to Susan Nycum, an attorney who chairs ACM's legal issues committee. Nycum added that commercial programs are now protected by trade secret law.

Contu member and Pulitzer Prize-winning author John Hersey reiterated his position against copyright protection for computer programs at the meeting here.

Computer programs are not literary works and should not be protected under a law designed for literary works, Hersey stated.

"A programmed set of orders in a microprocessor is not a literary work any more than a distributor of an automobile is a literary work," Hersey said. Software is a machine control device, he argued.

But writers of software don't agree. "We believe copyrights would give us extra protection to that offered by property law," Martin Goetz, senior vice-president of the software products division of Applied Data Research, maintained.

With its hearings completed and the public comment period on its draft proposals for copyrighting software and data bases over, Contu must now review all that it has heard in preparation for completing the recommendations it will send to Congress.

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We couldn't agree more. The new "eights" really do yield more "bang for the buck" as the Gray Sheet puts it.

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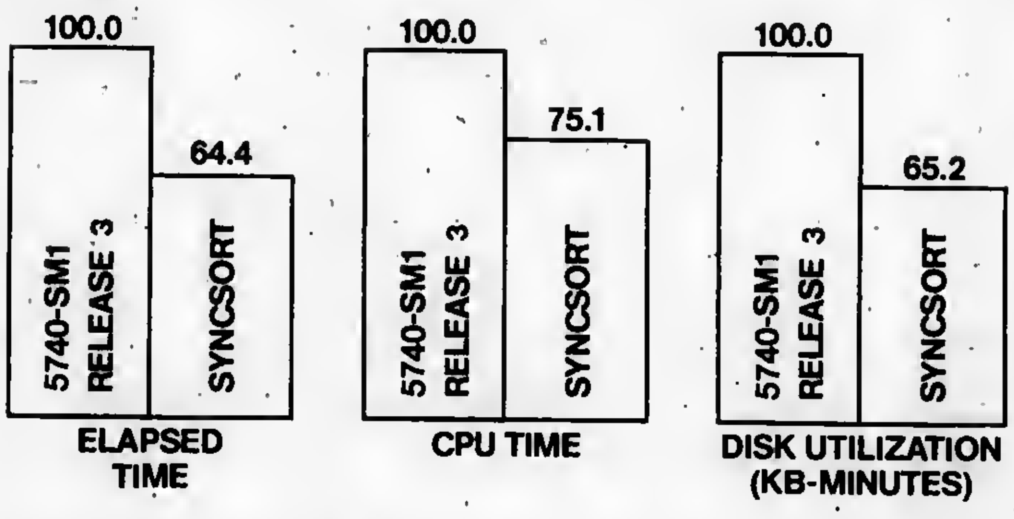
If you'd care to prove that for yourself, just try a couple of benchmarks comparing the two sorts on exactly the same files. You'll see a picture of resource usage that looks like this:



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White House Takes Action On Data Flow, Privacy Act

By Nancy French
CW Staff

WASHINGTON, D.C. – Transborder data flow and the protection of privacy is now getting White House attention, according to Christine Dodson, executive secretary of the National Security Council.

Dodson was charged with the responsibility of finding out what the "American interests" might be in the subject of transborder data flow less than a month ago, when a formal committee was set up within the National Security Council with Dodson as the "action officer."

Until that time, the issue of transborder data flow for American business was handled by an interagency task force set up last December under the Department of State.

There is also a glimmer of interest on the part of President Carter in the recommendations of the Privacy Protection Study Commission concerning new privacy standards for government recordkeepers, according to David Linowes, formerly chairman of that commission.

To date, Linowes has had several meetings with the White House staff member responsible for coordinating Privacy Act implementation within the federal government. All department secretaries have been requested to submit implementation plans to the White House; to date, three have complied.

No further action is expected on the private-sector data privacy bills introduced in the House of Representatives by Barry Goldwater Jr. (R-Calif.) and Edward I. Koch (D-N.Y.) until after the first of the year, according to Carole Parsons, executive director of the Privacy Protection Study Commission.

Over the Border Means Out of Control

LONDON – The Internal Revenue Service (IRS) has become interested in the information it could gain from U.S. time-sharing companies whose data bases contain information belonging to certain overseas customers – such as Swiss banks, according to Donn Parker, a senior research associate at SRI, Inc. in Menlo Park, Calif.

Speaking at a computer security symposium here recently, Parker told the story of a Swiss bank which contracted with a U.S. time-sharing service firm to process its data. Rather than processing and maintaining the data in Switzerland, however, the American firm sent it to its computer installation in Rockville, Md.

Bank records are not subject to subpoena by tax officials in Switzerland; however, they are in the U.S.

Parker said he mentioned this in an article he wrote for the *New York Times*. About a week after the article appeared, two IRS representatives paid him a visit to learn more about this practice.

Parker told them all he knew, he said, which wasn't very much because time-sharing firms "studiously avoid knowing anything about the contents" of their customers' records and because the friend who told him about the contract didn't know any more.

It was never determined whether the records the time-sharing firm maintained for the bank were numbered accounts or some other type of data.

But the moral of the story, according to Parker, is that under existing laws, foreign banks or any other businesses can't expect to guarantee their customers the usual level of confidentiality when another firm is processing their data in another country.

Study Finds Workers Unaware of Data Rights

(Continued from Page 1)

protecting their privacy.

Knowledge about the kind of information to be released internally would decrease employee concern, according to 87% of the respondents. Prior knowledge of the type of externally released information was important to 94%, the survey showed.

Standards Vary

The study, conducted early this year, included one questionnaire answered by employees, on their perceptions and "comfort" with the use and maintenance of private data; another questionnaire answered by senior recordkeepers in each corporation probed their actual practices.

All the corporations expressed concern about privacy of their employees, but the recordkeeping standards varied from company to company and even within departments.

None of the corporations had written procedures for release and handling of personal information, but all agreed they had an informal policy that placed restrictions on all but job-related uses of information.

All the companies had assigned responsibility to a specific person for the privacy protection of their employees.

Three of the five companies had no written policies allowing employees to amend their records, but three companies permitted their employees to inspect their personal records. In one case, state law required employee records to be made available upon request.

Some of the companies indicated they advised and obtained prior consent from employees concerning certain kinds of external disclosure such as data released to attorneys representing other people, medical practitioners, political parties, government agencies, insurance companies and lending institutions.

Proper Disclosure

Consent for release was usually sought for research organizations, courts with subpoena power, law enforcement agencies, educational institutions and unions.

Study results showed employees felt data used for organization decision making regarding prior or possible performance was proper. But they felt that personal information used for research, charity drives and general or specific auditing was improper, and their comfort levels declined accordingly.

However, certain types of information appeared sensitive for all internal use. More than 50% felt the use of personal financial information, other than payroll, was improper for all internal uses.

The study did find that employees approved of the release of personal data if it was relevant to the decision-making process. For example, releasing medical information was acceptable to the respondents when it was used in hiring or job assignment decisions.

Employees considered political parties, mailing list companies and attorneys representing other people least proper to receive personal information and considered courts with subpoenas, local and state governments and the Internal Revenue Service most proper to receive information.

Typical Respondents

Respondents were mainly white-collar office workers, including middle and higher level managers, engineers, scientists, supervisors, analysts and technicians as well as clerical personnel, secretaries, skilled craftsmen and semiskilled workers.

The majority of respondents was drawn from a random sample and was made up of males with a college degree between the ages of 30 and 39. The average respondent had worked for his company for more than 15 years in a nonsupervisory capacity and earned more than $25,000.

Higher paid employees had the most accurate perceptions of company recordkeeping practices and males were more accurate than females, the study found. These two statistics are closely related, since most females were paid lower wages than males.

Overall, those with the most accurate perceptions were older, earned higher salaries and had been with the company for a longer period of time. In addition they tended to be more satisfied with the company's practices.

Types of Data

One section of the employee questionnaire contained a list of 60 different types of personal data and asked which ones employees believed might be stored by their employers. The perceived answers were compared with the data obtained from the recordkeepers on what the actual policy was.

For the most part, employees overestimated the types of personal data their companies stored, particularly in regard to the kinds of affiliations and activities in which they were involved.

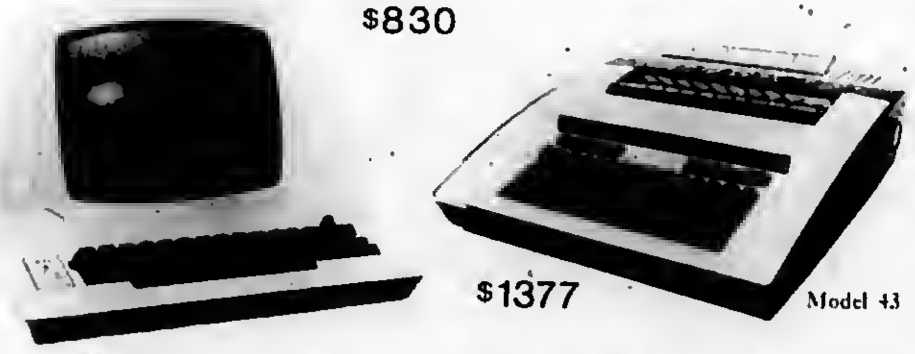
But employees underestimated the types of medical information kept, believing many items were not stored when in practice they were.

The study concluded that employees were not greatly concerned about the use of personal information within a company or were concerned about release for use for certain purposes outside the company. It also concluded that informed participation by the employee diminishes concern.

The study cautioned, however, that the data cannot be generalized as representative of all employees in all U.S. corporations and should be considered an attitudinal study based on one point in time.

Copies of the study can be obtained through the Information Privacy Research Center, Krannert Graduate School of Management, Purdue University, W. Lafayette, In. 49707.

ECONOMY and POWER



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EEC Moving Toward Data Protection Accord

By Nancy French
CW Staff

STRASBOURG, France — The European Economic Community is moving toward adoption of an international agreement that would provide minimum uniform data protection among member countries — a move hotly contested by U.S. firms presently operating there [CW, Oct. 3].

At a meeting here recently the Council of Europe's Subcommittee on Legal Affairs continued to refine a proposed data protection convention that would require countries to take whatever measures are necessary to ensure protection for personal data processed in their territories. Signers of the convention would have to assure that the rights, liberties and essential interests of individuals are respected, regardless of nationality.

U.S. multinational companies and time-sharing/service firms oppose such a convention and the regulatory body that would go with it on grounds they could impose a burdensome and costly layer of restrictions on their international operations. They also contend that evidence of privacy abuse that would warrant such an agreement has not been presented.

The U.S. would be unable to comply with such a convention as things presently stand, since it has no data protection authority or licensing board to coordinate compliance and no privacy laws that are binding on private-sector organizations.

However, the Europeans are apparently unconcerned about lack of U.S. participation in development of the agreement. F.W. Hondius, who heads the directorate of legal affairs which met here, reminded participants that they have a mandate to develop a data protection convention by Dec. 31, 1979 — with or without American participation.

If the agreement is adopted by the European countries, the U.S. apparently would be bound by its provisions if it wished to continue to transmit data between itself and the member countries and/or process data there.

Terms of Convention

The convention, which is seen by some Americans as naive and not based on the type of empirical evidence of privacy abuse turned up by the U.S Privacy Protection Study Commission, calls for protection of any [computerized] information relating to identified or identifiable natural persons — but excludes legal persons — or businesses.

The convention would require countries to assure that an individual could query the "controller of an automated personal record" to learn whether a record on him exists and then could obtain and correct it.

No exceptions would be permitted other than in cases where the law defines files as legally secret.

The "controller of the record" would be required to assure that personal data is collected 'by lawful and fair means,' and that it is "accurate and up-to-date as well as appropriate and relevant to the purpose of the record."

In addition, data which reflects racial origin, philosophical, religious, political or trade union views of a person would not be permitted in record systems without the individual's consent or unless expressly authorized under another provision of the law.

Inaccurate data would have to be corrected. Obsolete, inappropriate or irrelevant data or data recorded in violation of other provisions of the convention would have to be "erased," the convention said. However, it does not require the controller to contact other organizations to whom that information may already have been provided.

Installation Protection

The convention also calls for the processor of the record to protect DP installations and devices as well as the data and programs stored there against accident, wilfull loss or destruction, unauthorized access, alteration or release.

Each contracting state would be responsible for all DP installations within its own territory. However, in cases where such installations form parts of a DP system distributed over two or more countries, the privacy board in each country would have to cooperate to provide the necessary protection of information.

The controller of a personal record distributed over two or more countries would decide and then declare which of the states is the official domicile of the records. The country that accepts responsibility as the official domicile of such a distributed record would be required to inform the other contracting states accordingly...

Then, wherever else the data goes, it would be required to receive the same protection afforded it in its official domicile.

Any decision, ruling, injunction or judgment made for the protection of a data subject against any controller or processor of an automated personal record in one contracting state shall be given effect in every other contracting state, the proposal said.

The privacy authority in each country would be required to furnish information on its laws and regulations to the other signers of the convention. They would also be required to verify the existence of automated records.

In addition, they would be expected to transmit requests from data subjects to the appropriate countries and investigate problems that occur.

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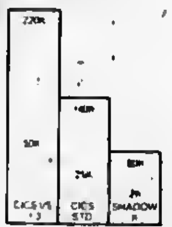
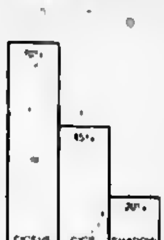
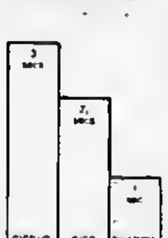


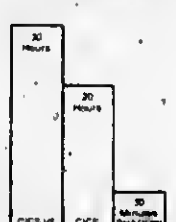
Memory Usage



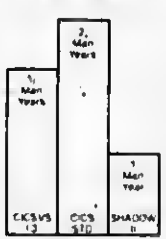
CPU Utilisation



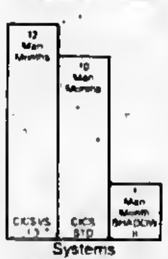
Response Times



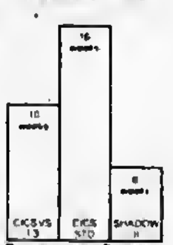
Installation Time



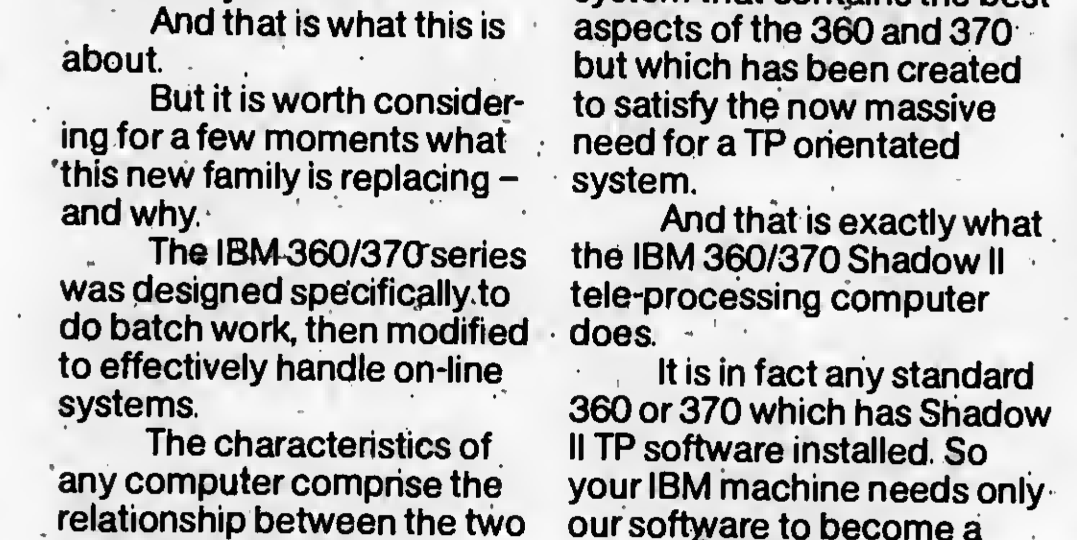
Application Development Time



Systems Programmer Time For Maintenance



Programmer Training and Learning Curve



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IBM 3031, 3032 Offer More Power

(Continued from Page 1)

equivalent 6M-byte configuration.

Similarly, the 3032 processor offers 2.5 to 3 times the internal instruction rate of a similarly configured 370/158-3 running under Release 3.7 of OS/VS2 MVS, IBM said, at a price increase of about 20%.

Again, the *Computerworld* figures indicate the system actually has more internal power than the 370/168-3, even though its price tag is $1.6 million less than that for a 168-3 in a 6M-byte configuration.

Although IBM chose not to emphasize the price reduction aspects of the 3031 and 3032 by comparing them to dissimilar machines, the move was already dubbed "the greatest price cut in industry history" by several observers last week.

In all, the reductions amounted to 40% on the systems compared with their 370 counterparts.

Like the 3033, the 3032 and 3031 have very low purchase/lease and purchase/rental ratios, which are used by the industry to determine the expected systems life for IBM products.

Initially on the 370 series, the purchase/rental ratio was set at about 45 months. Using the same techniques for the 3031 and 3032, that ratio drops to around 35 months, an indication that the firm expects them to be actively marketed for only three to five years, compared with the four to seven years expected for the earlier units.

Move to Firmware

The systems continue the trend of placing operating systems in firmware. Both have the System/370 Extended Facility as a standard feature, which is also standard on the 3033 and an option on the 168-3.

This firmware incorporates certain functions previously found in software that can be called by IBM's MVS/System Extensions program product. With the use of this firmware, throughput is increased through reduced supervisor path lengths, better resource control and less software contention, according to IBM.

In addition to MVS, VM/370 will be available on both machines at the time of first deliveries, as will DOS/VS for the 3031 only. SVS, OS/VS 1 and the Airline Control Program (ACP) will be offered on the machines during the second quarter of 1978, IBM promised.

Intriguing Features

The most intriguing features of the two systems are four-way memory interleaving and the instruction preprocessing of the 3032 and the instruction prefetching on the 3031. These, coupled with the faster cycle times, add up to the performance improvements, IBM said.

The four-way interleaving — a standard feature — compares with the two-way interleaving available on earlier 370s.

The 3032 separates the preprocessing and execution functions, permitting the system to prepare one or more instructions while it is executing still another, IBM said. The preprocessing function is built into firmware and runs in its own buffer memory.

Similarly on the 3031, several instructions can be prefetched while one is being executed, with the prefetching done by firmware in separate buffers.

The units are compatible with members of the 370 family and use the same peripherals.

Both of the systems feature 32K of buffer storage compared with the 148, which had no buffer storage, and the 158, which had 16K buffer storage. The 168 also features 32K buffer storage and the top-of-the-IBM-line 3033 has 64K of buffer memory.

The basic machine cycle time is 115 nsec for the 3031 and 80 nsec for the 3032. For the 148, the cycle time is 180- to 270 nsec; on the 158, the cycle time is 115 nsec.

A similar pattern appears for the memory cycle times of the machines. On the 3031, the time is 345- to 805-nsec compared with the 148's 405- to 540 nsec memory cycle time and the 158's 620- to 1,035 nsec cycle time.

The 3032 with a memory cycle time of 320 nsec is more comparable to the 168-3, which also sports a 320 nsec memory cycle time.

Both of the units are available with 2- to 6M-byte main memories, but the 3031 is upgradable in 1M-byte increments while the 3032 can be upgraded only in 2M-byte steps.

Both units feature six built-in channels consisting of one byte-multiplexer channel and five block-multiplexer channels. The byte multiplexers operate at a rate of 40- to 75K byte/sec and each block multiplexer is capable of speeds up to 1.5M byte/sec.

The 3032 can accommodate an optional channel block with the same characteristics as the first six channels.

Channel Feature

In addition, the 3032 offers an optional two-byte-wide channel feature that can operate up to 3M byte/sec, IBM said.

This unit was designed to handle high-speed I/O devices such as the 2305-1 disk unit and the 3838 array processor, IBM said.

While neither of the systems is available in true multiprocessor configurations, an optional channel-to-channel adapter is available that allows communications between channels on different processors of a loosely coupled multiprocessor system, IBM said.

The 3031 in a 2M-byte configuration sells for a flat $1 million, rents for $27,497/mo and is available on a four-year lease for $25,000/mo.

For a 6M-byte system, the purchase price is $1,455,000, rental runs $43,207/mo and the lease rate is $39,310/mo.

The 3032 sells for $1.9 million in the 2M-byte configuration, which is available at $48,110/mo on rental and $43,740/mo on lease.

The 6M-byte 3032 carries a $2,368,000 purchase price tag, rents for $64,290/mo and leases for $58,470/mo.

Itel Reacts

SAN FRANCISCO — Within hours of the IBM 3032 and 3031 announcements, Itel Corp. announced its AS/6 processor, which is reportedly 1.1 to 1.25 more powerful than the 3032 and four to six times as powerful as the firm's AS/5-3.

The AS/6 Model 7032 CPU features a 72 nsec machine cycle. The unit comes with a standard 2M bytes of memory and can be upgraded in 1M-byte increments to a maximum of 16M bytes. The unit uses a 64K-byte buffer, according to the firm.

An AS/6 with the 7032 CPU and operator console, two I/O processors with a total of six channels and 2M bytes of main memory cost $1.96 million compared with $1.9 million for a 2M-byte 3032.

Dog Track Bettors Bilked

(Continued from Page 1)

In a legitimate operation the two computers, which operate in parallel, would generate duplicate lists of winning ticket numbers at the same time. At Flagler, however, the suspects turned off one of the machines for a few minutes after each race and entered the ticket number of fictitious winners, Dardis said.

Thus, when they turned it back on, the computer indicated many more winning tickets than in fact existed. At times, the imaginary winners outnumbered the legitimate ones by three or four to one, Dardis explained.

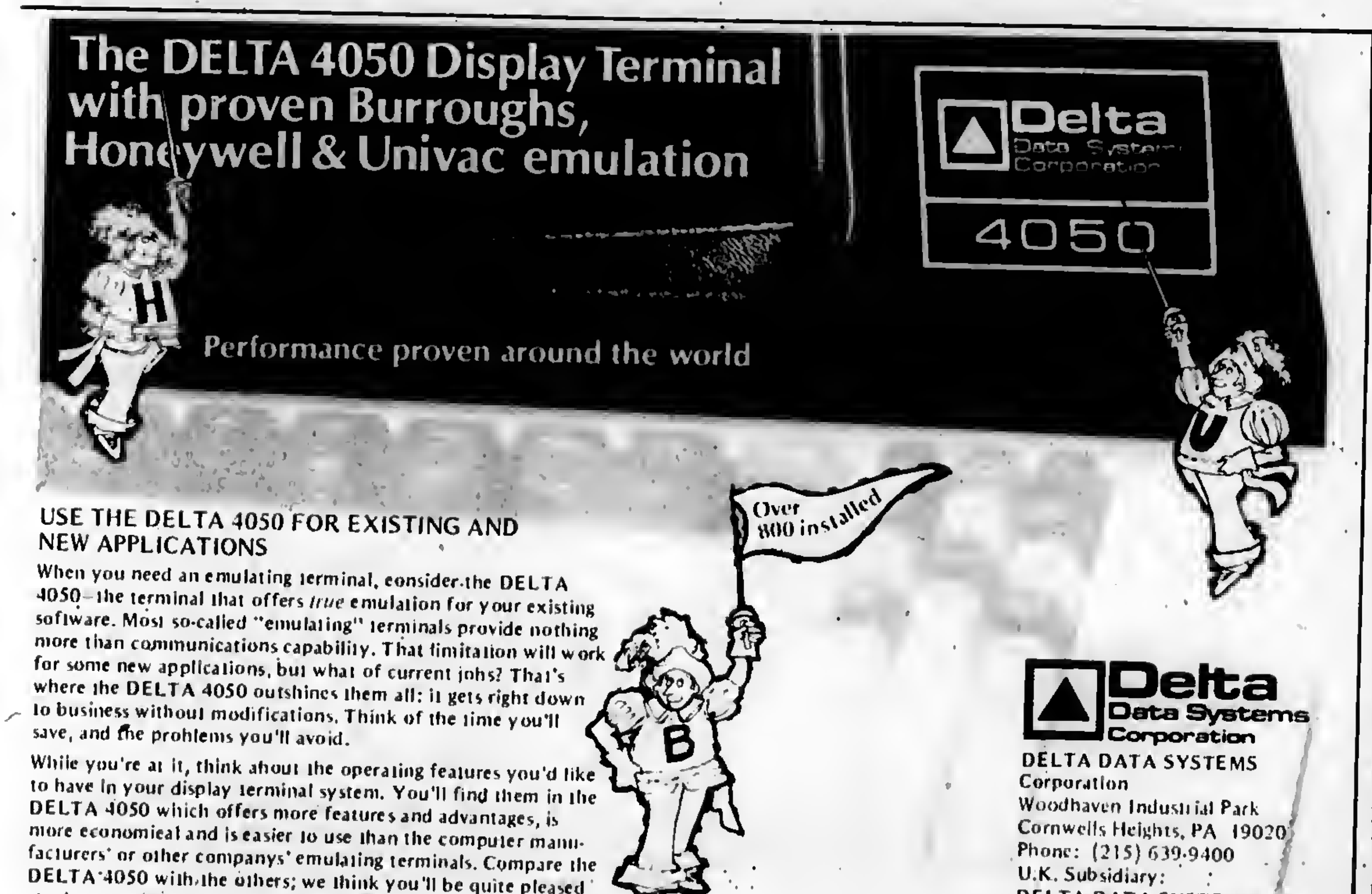
To conceal their actions, the suspects then destroyed the output of the other computer and printed phony tickets, which they cashed at the track the next day, he added.

By increasing the number of apparent winners, the conspirators were able to minimize the payoff to each legitimate winner and keep the leftover funds for themselves, Dardis alleged.

In devising their plan, the suspects took advantage of the fact that the results of trifecta gambling are seldom publicly displayed, as are the odds and winnings for almost every other form of greyhound betting. Instead, Flagler's trifecta information is stored in the computers because of the large number of variables involved.

As a result, the duped trifecta bettors had no way of finding out how much they had won except by asking the very officials who were involved in the alleged swindle, the chief investigator explained.

State legal authorities first became suspicious of Flagler's trifecta betting operation when a customer who apparently was not involved in the conspiracy cashed winning tickets totaling $156,000, "which is an unusually large amount," Dardis recalled. When they Investigated further, authorities found that all the tickets had come from one printer and that they exceeded the value of all the legitimate tickets that had been generated by that machine.



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IBM Opposes Trial Examiner, Cites Conflict

By Catherine Arnst
CW Staff

NEW YORK — IBM has asked that an order appointing an examiner in the U.S. vs. IBM antitrust trial be struck down on the grounds of conflict of interest. The examiner was named to search IBM corporate files for statistical information on its installed systems.

IBM is opposing Judge David N. Edelstein's appointment of Herbert H. Isaacs, an accountant with Arthur Young & Co., because Isaacs is also working as a paralegal in support of Memorex Corp.'s pending antitrust case against the mainframer [CW, Sept. 12].

Although Edelstein knew about the Memorex connection, he did not mention this potential conflict of interest in his order.

IBM filed a writ of mandamus with the Second Circuit Court of Appeals to ask it to "intercede and correct this blatant use of judicial power." IBM's writ complained that Isaacs would be acting on behalf of the government and would have broad power to examine corporate files and question employees under oath.

"The broad powers delegated to the special master . . . should not be conferred upon a nonlawyer employee of an accounting firm as they were here," IBM said.

The order, the writ said, should be nullified as "an irresponsible abuse of discretion" because of Isaacs' involvement with Memorex, whose lawsuit against IBM involves "virtually identical issues as those now on trial in U.S. vs IBM."

IBM also claimed that it was given only one day to respond to the names the government suggested to Edelstein for the examiner's post and that the government "made no attempt to seek agreement with IBM counsel."

In a letter to Edelstein, chief counsel for the government Raymond Carlson wrote that IBM's writ is a "transparent attempt to reargue the court's decision . . . and as yet another attempt to delay access by plaintiff and the court to statistical evidence relevant to the issue of IBM's monopoly power in the systems market."

HIS Boosts Upkeep Prices

WALTHAM, Mass. — Honeywell Information Systems, Inc. will increase maintenance prices by 6% to 15% and software license fees by an average of 5% on most of its computer systems.

In addition, the firm announced hikes of 2% to 7% in monthly rental prices as well as a 7% increase in the purchase price of selected computer equipment.

With minor exceptions, Series 60 rental and purchase prices were unaffected by the price changes, which took effect on Sept. 30 for new customers. Adjustments for equipment under existing contracts will become effective Jan. 1, according to a spokeswoman.

To illustrate the changes, the spokeswoman compared old and new prices on a Model 2020 with 32K words of memory, a 450 line/min printer, a card reader/punch and a disk subsystem with 9.2 million characters of storage. The contract maintenance price on this system rose 9% — from $904/mo to $985/mo; the purchase price remained unchanged and the rental price on a five-year lease increased 5%, from $2,726 to $2,862, she explained.

Similarly, for a Level 62 system configured with 224K bytes of memory, the maximum CPU performance level module, a 1,200 line/min printer and 480 million bytes of on-line disk storage, the five-year rental cost rose 2% from $6,966 to $7,017 per month, the purchase price remained unchanged and the maintenance on a purchased system rose 9% from $1,393 to $1,573 a month, she said.

Fees for systems engineering and selected education services also were increased an average of 8% while prices for data network services were raised 9%, the spokeswoman added.

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Despite Onslaught of Data Banking

UK Laws Hit as Inadequate Privacy Protection

By Joseph Hanlon
Special to CW

LONDON — "British law is inadequate to protect privacy," the National Council for Civil Liberties (NCCL) warned in a report entitled "Privacy: The Information Gatherers," published here recently.

Although privacy has been an issue in Britain for the last decade, the record "is one of almost total inaction," the report lamented. "The United Kingdom has fallen behind most Western countries in protecting individual privacy."

The report catalogs a series of new computer data banks and data exchanges that have been set up during the past 10 years. Although data banking in Britain is far behind that in the U.S., it is catching up; there are now a national police computer, a national driver and vehicle license computer and, in a limited form, computerized records of all hospital admissions.

In addition, a computer data bank was set up last year that will eventually contain the immunization and school health records of every child.

In Britain, even TV owners must have a license, and that file is also computerized; it is automatically correlated with a computerized list of households and letters are automatically sent to every household without a TV license inquiring why it does not have one.

Local governments are increasingly computerizing their records and the NCCL report cited recommendations from the Local Authorities Management Service and Computer Commitee (Lamsac) suggesting local governments set up data banks of people with link numbers so different records about the same person can be matched up. Lamsac recommended whoever inputs data should also regulate its use. But the NCCL warned that "although it is possible to 'code' the system so that, for instance, only the social workers responsible for a particular family can see the printout of a family's record, it is hard to believe that other officials — for instance, housing officials making a decision about housing allocation — will, if the decision is left to them, resist the temptation to have comprehensive information about that family. The point is that the decision must not be left to them."

The report also looked at medical records and noted that "in the absence of any statutory safeguards, some doctors also fear that computerized medical data could be linked with social service, criminal or other records and used for political or other purposes which the doctor and patient have no control over.

"Since the police already ask general practitioners to inform them about patients who may be police suspects, the danger of a complete linking of medical and criminal records is not remote," the report pointed out.

Although the report warned that "computerization does change the scale of the problem," it argued that "the threat to individual privacy posed by data banks does not, in essence, change if the information is computerized instead of being stored in filing cabinets."

Thus the NCCL objected to the UK government's decision to restrict its Data Protection Committee to considering only computer data banks.

The report concluded with the NCCL's new 10-point Charter of Fair Information Practice, which draws heavily on U.S. experience in its requirements that:

- No personal data bank must be secret.
- Individuals should have the right to see, challenge and correct their own files.
- There should be legal controls on the way information is collected.
- Information collected should be relevant and the minimum needed.
- Information given for one purpose should not be used for another without the data subject's knowledge and consent.
- There must be legal restrictions on the linkage of personal record systems.
- Transfer of personal information abroad must be controlled.
- Codes of practice should be developed for all those involved in collecting and storing personal information.
- The law should guarantee the individual's right to privacy.
- A data protection authority should be established to supervise collection and storage of personal information.

UK Groups Urge Licensing Of Data Users, Not Bases

LONDON — The Users of personal data, rather than the processors, should be licensed, according to a policy statement issued late last month by three British computer groups, the British Computer Society, the Computing Services Association and the Data Processing Management Association.

The British government's Data Protection Committee is currently meeting to decide between two ways of controlling data banks: some system of licensing, as favored by privacy advocates; or an ombudsman to investigate complaints, as favored by civil servants.

The computer groups have come down hard in favor of the first approach on the grounds "that the public will find a licensing authority the more reassuring of the two."

The suggestion that the users of data, rather than the data banks themselves, should be licensed has provoked interest in privacy circles here. The groups argue that "the ease of collecting data makes effective control extremely cumbersome and difficult" and that, in turn, "facilitates evasion of controls."

For example, a service bureau or time-sharing service may be maintaining a data base for a commercial user without even knowing it.

"Any work that involves the use of personal data files carries with it a potential breach of privacy and the public may reasonably expect that such work is carried out under controlled conditions," the groups noted. They proposed that there should be a statutory licensing authority, independent of government.

This body would grant licenses for specific uses of personal data and specify a "sensitivity level." Then it would grant certificates to computer agencies and operators, permitting them to work on data up to a stated sensitivity level.

This form of licensing "provides intrinsic protection against unauthorized new applications, for instance the correlation of existing files that were not previously part of the same application. It provides protection regardless of where the work is done. And, above all, such control is enforceable."

Calendar

Nov. 14-16, Chicago — **Distributed Data Processing,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Department PR; AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 15-17, Arlington, Texas — **Sixth Annual Meeting of Computer-Aided Manufacturing-International, Inc. (CAM—I).** Contact: C.H. Link, Executive Secretary and General Manager of CAM-I, Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

Nov. 16-18, Chicago — **Distributed System Design,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 16-18, Montreal — **International Society for Mini- and Microcomputers (Mimi) '77.** Contact: Prof. J.L. Houle, Mimi '77, Ecole Polytechnique, Case Postale 6079, Succarsale A, Montreal, Quebec, Canada H3C 3A7.

Nov. 17-18, Montreal — **Canadian Association of Data Processing Service Organizations** (Cadapso) Annual General Meeting and Industry Conference. Contact: Cadapso, 299 Waverley St., Ottawa, Ont., Canada K2P OW1.

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Courts Tell Users: Burroughs Contract Ironclad

By Molly Upton
CW Staff

Two unhappy Burroughs users have learned to their dismay that a well-written sales contract can protect the vendor like a coat of armor.

The bad news came in two court rulings that found the limited warranty clause in the Burroughs Corp. sales contract protects the vendor from a user's attempt to sue based on a salesman's promises and warranties, express or implied.

The cases were brought by Byrd Tractor, Inc. of Manassas, Va., in the District Court of Virginia, Alexandria Division, and by Westfield Chemical Corp. of Westfield, Mass., in the Hampden County (Mass.) Superior Court.

Byrd charged breaches of express and implied warranties associated with a second-hand L5000 accounting computer which, after an 11-month installation, it asked Burroughs to remove.

Westfield sued Burroughs for breach of contract, breach of warranty, fraud and negligence in the manufacture, sale and servicing of an L3000. It charged that promised savings of man-hours never materialized and, in fact, machine operation took more time than the manual procedure.

Key Clauses

The Burroughs contract contained two key clauses, the courts found. First, it stated: "there are no understandings, agreements, representations, warranties, express or implied including any regarding merchantability or fitness for a particular purpose, not specified herein, respecting this contract or the material or services hereunder.

"This agreement states the entire obligation of Burroughs in connection with this transaction.

"It must be understood that you assume full responsibility for the overall effectiveness in which Burroughs equipment and software are to function, as well as responsibility for the cooperation of your personnel," the Burroughs contract stated.

"Once an order is placed for Burroughs equipment, such order will not be subject to cancellation by the purchaser due to any of the matters which are purchaser's responsibility."

The second provision limited damages. It stated: "purchaser hereby expressly waives all damages whether direct, incidental or consequential.'

Summary Judgment

In the Westfield case, Judge John M. Greaney agreed the contract precluded any claims on Burroughs and granted the defendant's motion of summary judgment, thus dismissing the case.

The disclaimers in the contract were effective to "disclaim all warranties, express or implied," including those alleged indications that the system would be appropriate for an accounting system, the judge said.

Burroughs' sole commitment to Westfield was to deliver, install and service the equipment as promptly as reasonably possible, according to the "Computer Law and Tax Report," (CLTR).

Burroughs was not responsible for any delay "nor for anything more than exchanging the equipment under the warranty (if Burroughs agreed to the exchange in writing," CLTR said.

In declaring the liability limitation valid, Greaney said the contract was "between businessmen acting at presumed arm's length." The limited remedy of returning defective parts was sufficient, he said.

What about the vendor claim, made during the preliminary planning stage, that the system would save man-hours. The judge ruled this was a representation of future performance, which is "not susceptible of actual knowledge and cannot serve as a basis of recovery in fraud."

He cited another case that ruled "when a representation relates to a matter not susceptible of personal knowledge, it cannot be considered as anything more than a strong expression of opinion, notwithstanding it is made positively and as of the maker's own knowledge."

Before such a matter can be submitted to a jury, the plaintiff must show the maker knew the statement was in some respect untrue, the ruling in Harris vs. Delco Products, Inc. stated.

Furthermore, since the user knows the vendor "cannot actually know what the fact of the matter is," he is not justified in relying on "the opinion of the speaker," Greaney said.

Also, Greaney observed, Burroughs had protected itself in the proposal by including a statement that the proposal was only preliminary and "the order when issued shall constitute the only legally binding commitment of the parties."

The judge pointed out four points frequently overlooked by users when negotiating contracts with suppliers:

- "The breach of warranty claim failed because there was a complete, conspicuous and valid disclaimer."
- "The breach of contract claim failed because the limitation of damage clause in the contract was valid and enforceable, and Westfield didn't claim it was breached."
- "The fraud claim failed because the indication of man-hour savings was a matter of opinion, estimate or judgement and not susceptible of exact knowledge."
- " Finally, the negligent manufacture claim failed since it is essentially a duplicate of the warranty and contract claims."

How to train your COBOL programmers in structured programming for $15 per student

When it comes to structured programming, the trainer's or manager's problem is twofold. First, he must decide which of the several methods of structured programming to teach. Second, he must decide how to teach the method. Up till now, neither decision has been easy, and it's little wonder that training in structured programming has been largely ineffective.

Now, I'm happy to announce a book by Paul Noll called *Structured Programming for the COBOL Programmer.* In my opinion, this book makes a major contribution to programmer productivity, because it does two things that haven't been done before. First, it presents a method for using structured programming that is complete, consistent, and practical. Second, it presents this method in a way that is educationally effective. In short, as you will see later, we guarantee that a programmer can learn to develop structured programs using the book alone. And that a programmer's productivity will increase as a result of this training.

Why Paul's Method Is Effective

It's not so much that Paul Noll has created a new method for using structured programming. It's more that he has refined and coordinated existing methods into a complete and workable system.

For instance, Paul uses IBM's HIPO for documenting his structured programs. Because IBM's implementation of HIPO is so cumbersome, however, he has developed his own HIPO subset . . . one that is easy to use.

Similarly, Paul has no objection to some of the existing methods for designing programs. It's just, he says, that they don't go far enough. They don't tell what type of modules belong at what level of the structure chart; they don't present a practical system for numbering the modules; and they don't relate the modules in the structure charts to the COBOL paragraphs. Furthermore, no one book or course presents a complete system for developing structured programs that includes design, documentation, coding, and testing.

In contrast, Paul's method is complete. He starts by telling you in detail how to design programs using structure charts. Next, he shows you how to create HIPO diagrams for each of the modules in the chart using his HIPO subset. Then, he shows you how to code the structured program using structured COBOL. Here, you will see how each paragraph in the COBOL program relates to one module in the structure chart. Finally, Paul shows you how to use top-down coding and testing to improve testing efficiency..

4 Reasons Why this Book Is Effective

1. This book was written by an expert from industry; Paul Noll. He has been a software specialist for a large company in San Francisco, and he is currently responsible for the training of 250 programmers. As a result, his programming methods are superb, and his teaching methods are effective.

2. Paul never presents theory without showing its application. In contrast to other books and courses, this book is based around the development of four different kinds of business programs. Once you see how Paul's method is applied in these programs, you will forever see the value of structured programming.

3. This book is designed specifically for the COBOL programmer. As a result, you will see all of the structured coding techniques in COBOL (and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book; you'll see structured COBOL, program stubs, test plans, walkthrough agendas, and much more. In my experience, these illustrations, more than any other factor, determine whether an EDP course is effective . . . and they are the missing ingredient in other structured programming books and courses.

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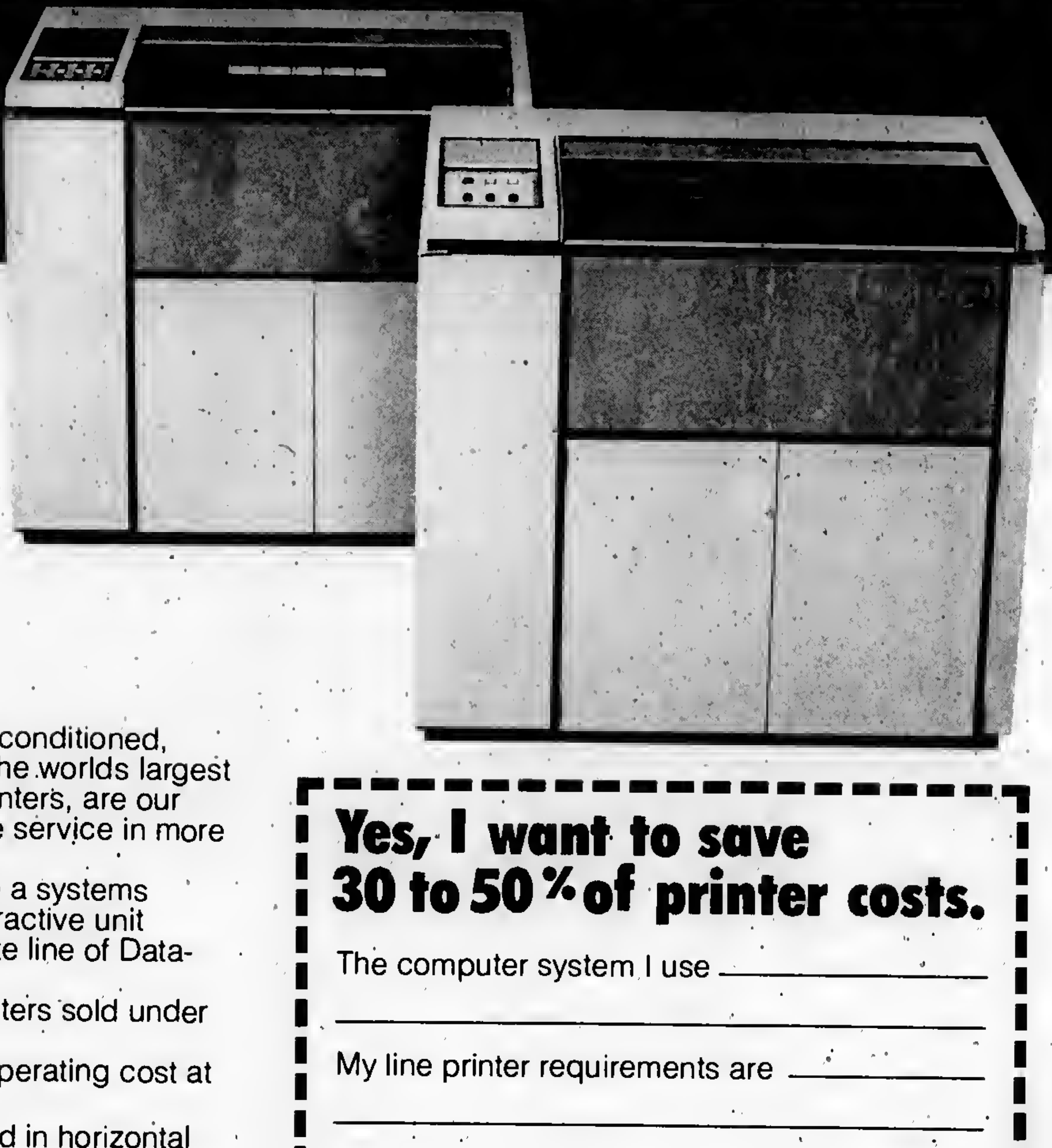

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Carter Asks EFT Use To Send Grant Monies

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter has asked federal agencies to use electronic fund transfers (EFT) to speed the payment of grant monies to state and local governments.

In a September 9 memo to agency heads, the President urged federal departments and administrations to work with the Department of the Treasury to identify grant programs that might be included in an EFT system — and particularly one that is being developed by Treasury as it extends its EFT capability for making payments to state and local governments.

"This is one way to reduce the occasions when grantees must spend their own money and wait for federal reimbursement," Carter said. "State and local governments should not be put in the position of having to lend the federal government money, which is, in effect, what happens when they must borrow money to pay bills while awaiting federal funds."

Federal grants to state and local governments currently total $72 billion each year, the President noted. The costs of inefficiencies and paperwork alone are "staggering," he added.

Carter included with EFT as methods of improving the timing of grant payments advance appropriations, letters of credit and labeling of checks so state and local officials know what programs the monies are to benefit.

"Several experimental [EFT] programs are now underway in, for example, the Department of Agriculture and the Department of Transportation," the President stated.

In addition to directing that EFT be used to help "modernize the way grant payments are made," Carter stressed the need for federal-state-local cooperation in the collection of information surrounding the giving and managing of grants.

"Agencies should establish cooperative data collection programs with state and local governments, wherever practical, to eliminate duplicative reporting of similar data by more than one level of government, so long as no legal prohibition against this exists," the President said.

The agencies must respond to the White House memo with proposed courses of action in these areas by Oct. 14.

Former Antitrust Official Not Sold on Bell's Stance

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Philip L. Verveer, who left the Department of Justice recently after heading its AT&T Antitrust Group since November 1973 when the suit against the Bell system was filed, said he remains "unconvinced" about Attorney General Griffin Bell's potential approach to large structured antitrust cases.

The Attorney General, in an interview with *Fortune Magazine*, said he favored settling antitrust suits that involve restructuring of an economic system through congressional action rather than the decision of a single federal judge.

The remark led some observers here to conclude that Bell wasn't interested in pursuing the case as vigorously as those observers thought he should.

Verveer, who is taking a new post with the Federal Trade Commission's Bureau of Competition, noted he did not leave the Justice Department as a result of Bell's remarks. Rather, "some difference of opinion" with his superiors on how to properly approach the suit's discovery phase, involving the exchange of documents and files between the government and AT&T, led him to resign his position.

The lawyer has advocated the institution of effective case management procedures in the massive antitrust suit throughout his tenure at Justice.

Asked about the attorney general's proposals for such cases, however, Verveer said he believes the courts can manage these suits if they are handled correctly.

"We haven't got the right to be so pessimistic about the court system, particularly where the parties present the case properly and the judge controls the course of the suit," Verveer stated.

Beyond that, the legislature is always there as a last resort, he added, maintaining that this resort should not be institutionalized.

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THIRD JERUSALEM CONFERENCE ON INFORMATION TECHNOLOGY, Jerusalem, Israel, Aug. 6-9.

The conference theme is "Computers, Communications and Technology Transfer." Primary emphasis will be on the role of computers in the transfer of technology between large and small countries and between developed and developing societies. Papers may be a description of a successful application, an account of original research, a report on the state of the art or a case study relating to technology transfer.

A brochure giving further details on manuscript requirements, review procedure and other information may be obtained by writing to the conference chairman, Anthony Ralston, State University of New York at Buffalo, 4226 Ridge Lea Road, Amherst, N.Y. 14226.

Four copies of a manuscript, not longer than 2,500 words, with a short abstract of 100 words, should be sent by Dec. 15 to Stanley Winkler, c/o Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

TRENDS AND APPLICATIONS 1978, National Bureau of Standards, Gaithersburg, Md., May 18.

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Three copies of a 1000-word abstract should be sent by Jan. 15 to program chairman, Dr. Ashok Agrawala, Department of Computer Science, University of Maryland, College Park, Md. 20742.

PATTERN RECOGNITION AND IMAGE PROCESSING CONFERENCE, Chicago, Ill., June 5-7.

Papers are invited on all aspects of pattern recognition and image processing, including statistical and syntactic pattern recognition; clustering; shape and texture recognition; scene segmentation and analysis; image filtering, enhancing and reconstruction; and medical, industrial and remote sensing applications.

Long papers (about 5,000 words and suitable for a 25-minute oral presentation) are due Dec. 1. Short papers (about 500 words and suitable for a 15-minute oral presentation) are due Feb. 1. Three copies of image processing papers should be sent to Prof. K. Preston Jr., Department of Electrical Engineering, Carnegie-Mellon University, 5000 Forbes Ave., Pittsburgh, Pa. 15213. Three copies of all other papers should be sent to Prof. R.L. Kashyap, School of Electrical Engineering, Purdue University, West Lafayette, Ind. 47907.

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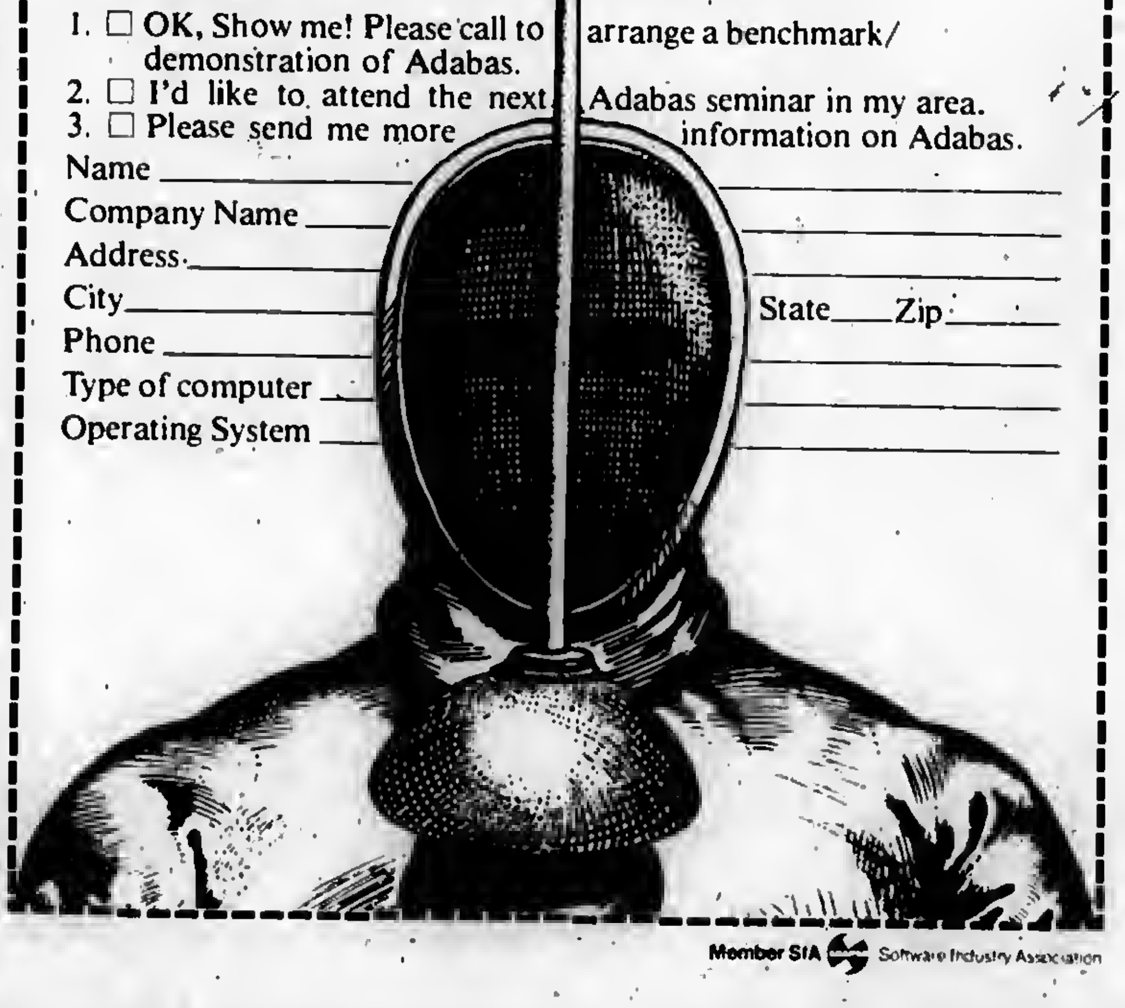

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Task Teams to Study Federal DP Revamp

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's reorganization project plans to form 11 task teams and to rely on extensive public participation in its year-long study of federal data processing, the Office of Management and Budget (OMB) announced here recently.

Six of the task teams will address planning and management issues unique to individual federal agencies, OMB said in a memo to agency heads.

The five remaining teams will tackle those government issues common to all agencies, emphasizing in particular acquisition of computer and communications capability, the "discussion draft" of the federal DP reorganization study plant stated.

Appearing before the Federal ADP Users Group (Fadpug), Walter W. Haase, deputy associate director for information systems in OMB and manager for the President's reorganization project for DP, stressed that OMB is "still in the stage of formulating the study plan."

The reorganization project expects, however, to begin operation of two of the task teams by Oct. 15 and to initiate the other nine by Dec. 1, Haase said.

In addition, OMB is currently selecting people inside and outside the federal government to participate on the task teams, he stated.

When the teams are finally composed, 50% of their members will come from state and local government, universities and the private sector, the draft study plan explained. Approximately 52 people will be task team members, Haase noted, permitting the size of each team to be small.

Management Staff

OMB will establish a project management staff of seven people to coordinate the planning and execution of the reorganization study. This staff will consist of two representatives from the private sector, two from federal agencies and three from OMB, Haase said.

The project management staff will coordinate the development of the option papers that Carter will use next September to decide what legislative and reorganization changes federal DP needs. "The President, in all of the issue areas discussed, will be the decision maker," Haase said.

The hundreds of specific comments and suggestions received by OMB between mid-July and mid-August [CW, July 11] formed the basis for the reorganization project's selection of issues to be dealt with by the task teams, th OMB official stated.

The acquisition process, the planning, management and use of computers by program agencies and the policy guidance, regulation and control exercised by central policy agencies drew the greatest number of comments from public and federal agency participants, Haase said.

One of the two groups scheduled to start operation in mid-October, the acquisition task team will address issues pertaining to the selection of computational capacity to meet agency needs. Haase expects this group to deal specifically with the sources of supply of computer and communications equipment and services to the federal agencies.

Haase received a warm reaction from the users group when he expressed OMB's desire to shorten the span of time — now three to five years — it takes a federal agency to acquire a major computer system.

An operational management task team will address problems associated with systems design and the management of federal DP operations. Similar teams will work on computer and related telecommunications standards issues and on personal problems unique to the DP community.

The final team oriented toward governmentwide issues will handle "central policy issues, broad organizational issues and alternative strategies for meeting federal DP requirements in the future," Haase said.

Scheduled to operate from March 1 to May 30 and to tie together the findings of the other teams, this task force will deal with the central agency control exercised by OMB, the General Services Administration and the National Bureau of Standards over federal DP under the Brooks Act of 1965.

The task team addressing agency-specific issues in the human and community agencies (the Department of Health, Education and Welfare, the Department of Labor and the Veterans Administration) will also start up next month.

The other teams dealing with unique agency problems will cover computer and communications operations in the national security agencies, the small DP user agencies, the national resource agencies, the general government agencies and the scientific and technical agencies, Haase stated.

The public will be asked to comment on the project's findings between May and July of next year, he added.

ZBB an Opportunity

The OMB official suggested that the introduction of zero-base budgeting (ZBB) for all federal programs provides an opportunity to develop "more meaningful analyses and justifications" for the use of computer and communication technologies.

FTC to Investigate Credit Bureau Data

WASHINGTON, D.C. — The Federal Trade Commission (FTC) has voted unanimously to begin a limited inquiry into the accuracy of information collected and disseminated by automated credit bureaus.

The inquiry will try to find out whether credit bureaus have reasonable procedures to assure the maximum possible accuracy of the information they collect on individuals, an FTC spokesman said.

Depending on the outcome of this inquiry, the commission will determine whether further action is needed to enforce the Fair Credit Reporting Act on a nationwide basis.

Commission policy prevents this investigation from being made public, the spokesman stated, adding that the existence of the inquiry doesn't imply that credit bureaus are violating the law.

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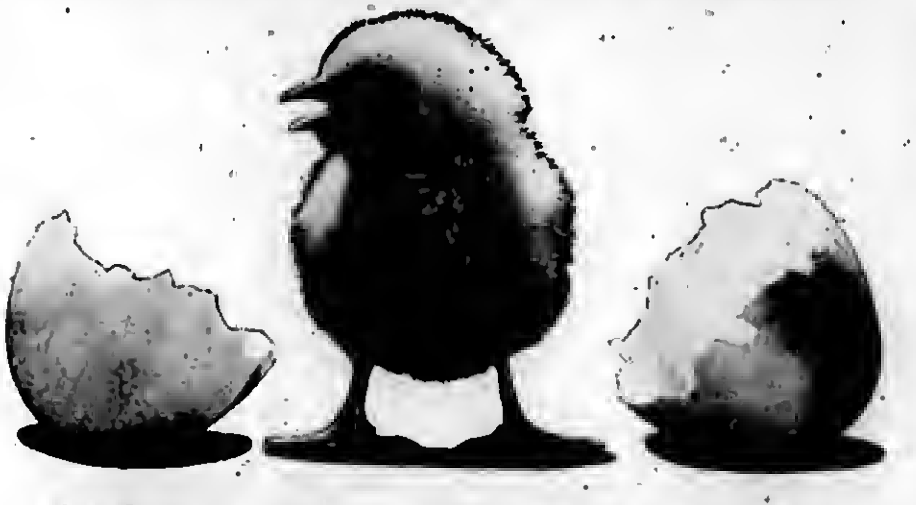

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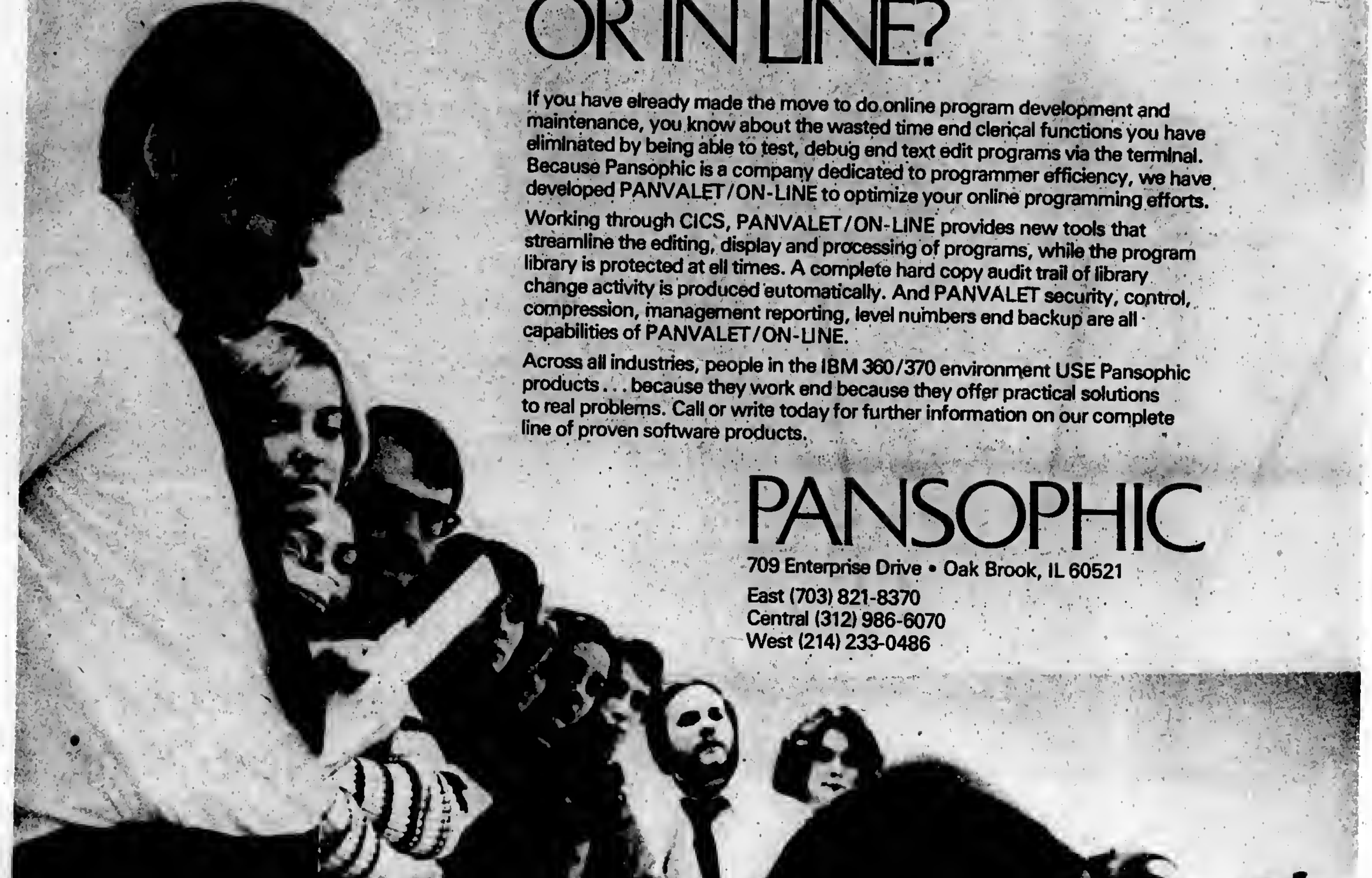

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Some Flood-Hit DP Sites Lucky, Others Not

By Ann Dooley
CW Staff

KANSAS CITY, Mo. — DPers had to struggle to keep their heads above water in the battle to save computer equipment endangered by flash flooding here recently.

While some installations were destroyed by water damage, others managed to save their computer equipment before the water could damage it.

One installation, Midwest Pre-Cote Co., a construction firm that builds roads and parking lots and repairs streets, saved all its equipment, moved it off-site and was back in operation two days after the flood sruck.

Allen Watkins, DP manager, was notified shortly after the flooding began that Pre-Cote's computer equipment might be in danger. "From then on, havoc set in," Watkins recalled.

"When I reached the building at 1:30 a.m., the water wasn't inside yet and we began to move files, card stock and everything else we could find to the second floor or at least desk-top high," he said.

Water 3 Feet High

By 3:30, when an IBM customer engineer arrived, the water was three feet high inside the building. All the power was shut off in order to avoid short circuiting.

At that time, the company's IBM 360/20 was still inside and in danger of being destroyed.

The system had to be torn apart and moved out of the building to save it.

The IBM engineer disconnected the cables from the machine and then attached wheels so it could be moved onto a truck.

The whole operation was done by flashlight and the IBM engineer had to dismantle everything by touch in at least one foot of water, Watkins said.

Although the moving truck had some difficulty getting through the flooded area, all the equipment finally was loaded and moved to a safer place. By the time the equipment finally was moved, the water was "hip high.'

No Light Load

The print unit and attachment, which weighed approximately 1,460 pounds, and the CPU, weighing about 800 pounds, didn't make it an easy job, Watkins said.

When the equipment was returned two days later, some water damage was found and fans were used to dry out excess moisture.

In addition, all the connecting cables had to be cleaned and the machines repositioned and dried out so no shortages would occur.

"Three days after the flood, you could hardly tell it had hit us," Watkins said.

Pre-Cote's DP staff worked overtime to catch up on applications such as payroll for the 300 employees, accounts receivable, accounts payable and depreciation. But everything is still not up to date, and "it will probably take two weeks to get everything really back to normal," Watkins said.

"IBM really came through and got us up and running," he added. "I can't speak highly enough of them."

Bank Less Lucky

Plaza Savings Association was less fortunate in surviving the flood. Loocated in the Country Club Plaza shopping area, the area hardest hit, Plaza Savings lost its IBM 3600 consisting of eight terminals and a controller.

Four or five IBM 3604s were destroyed after the six feet of water swept into the bank, according to Jo Harris, assistant controller.

The flood, which hit the main office, also took down a whole loop of branch offices as well as the central site. But within two days IBM replaced the leased equipment by chartering a plane to fly in new equipment, Harris said.

"IBM's service was excellent," he said.

Now operating out of a branch office until the headquarters can be repaired, at least computer operations are back to normal, he said.

The flood which was so severe experts estimated it would happen only once every five hundred years, killed at least 19 people.

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Software Scene 'Diseased' But No Cures Near: King

By Don Leavitt
CW Staff

CHICAGO — "Whatever other adjectives one would wish to apply to the software scene, 'diseased' is certainly appropriate," according to David King, president of Infotech International of Los Angeles.

The state of software design is not yet at the point that one can start prescribing cures for whatever ails it, he told the Eighth Annual Professional Training Conference at the Marriott-O'Hare Hotel here recently.

But, he added, it might be possible to define what its state of health ought to be.

"That would be like trying to play the role of a doctor at a time when medicine is almost totally undeveloped," he remarked at the meeting, which was sponsored by Advanced Systems, Inc.

Intangibility Good and Bad

Because it is intangible, software offers both good and bad features, King noted. Among the good things, he said, is the fact that there is no material degradation and no hidden properties that might affect its production. By contrast, there are electrolytic effects in the production of electronic devices.

But, he warned the DP trainers, no material constraints have been placed upon software design, and that becomes a bad feature when combined with the fact that, to the users, the design and structure of a software package are virtually invisible.

"That provides an opportunity — if you can call it that — for the designer to misbehave grossly," King said. If a software development effort, "you can get away with a standard of design, at least locally and microscopically, which really would not pass muster for a moment in an automobile, a bridge or anything like that."

Correct Before Efficient

A healthy software development team would start by producing a program that is correct and then transform it into one that is efficient, instead of the other way around, the publisher noted. Most programmers work to produce a program that is efficient and then they enter into the stage known as debugging, in which they try to transform that efficient program into a correct one, he explained.

That situation has led to many of the functional-decomposition methods which have been developed in the past decade. But for the most part, they still lack the constraints needed to produce a correct design and a model on which the design — not the program — can be tested, King added.

The function-decomposition approach won't really solve the problem, he contended, since "the function is not fundamental; it is the model that is fundamental," and designers must create it first.

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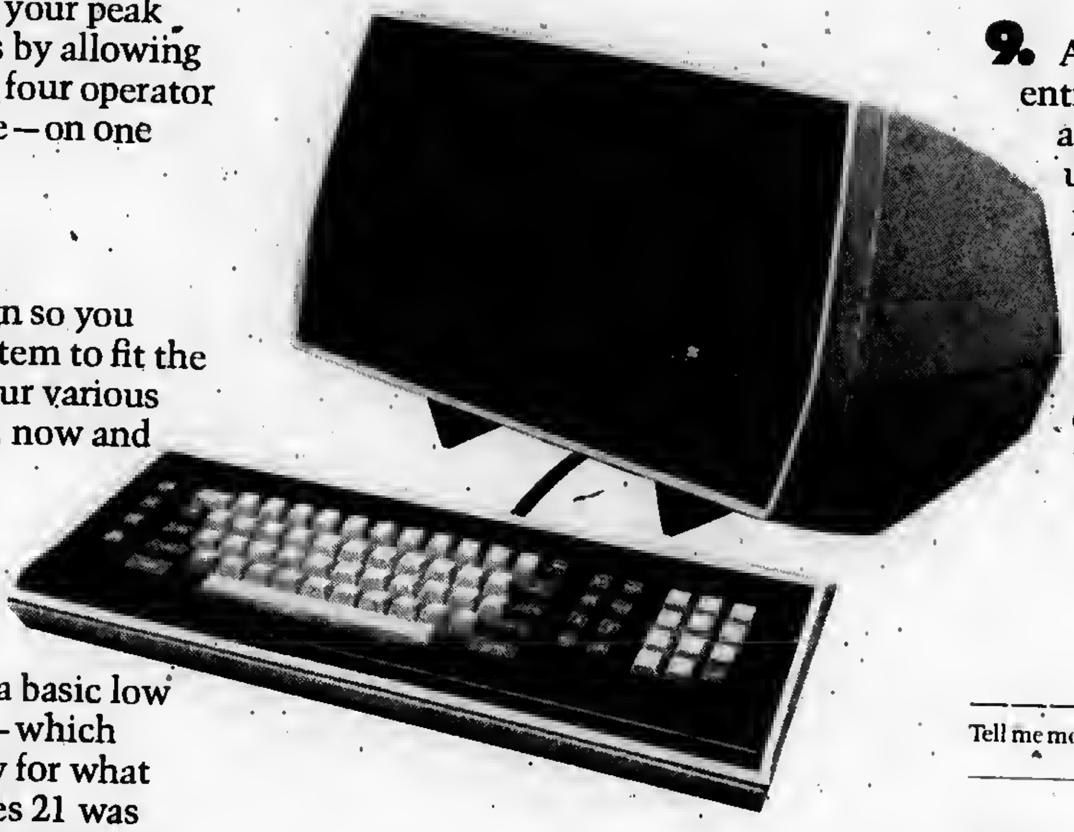

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Braniff System Speeds Ticket-by-Mail Delivery

By Jeffry Beeler
CW Staff

DALLAS — Braniff International and the U.S. Postal Service have applied at least some of the elements of an electronic mail network to an experimental ticket-processing system that has been undergoing tests here since Aug. 12.

The ticket-by-mail system, which Braniff officials claim is the first of its kind in the airlines business, is built around the company's existing flight reservations computer, an IBM 2314 disk drive unit and a teleprinter at the Dallas Post Office.

When a customer reserves a flight at Braniff's Love Field office and asks to receive his ticket by mail, a clerk enters the necessary reservations data through an on-line terminal into the airline's 1M-byte IBM 360/65 mainframe, which sends the information to the post office.

There, a Di/An Controls, Inc. 8100 teleprinter generates the customer's ticket, which a postal employee stuffs into an open-windowed envelope for delivery in the next day's mail.

The main advantage of such a system is speedier ticket delivery, according to Lou Garcia, a Braniff vice-president. Within five minutes of the time a customer makes a reservation at the Braniff office here, the system can process a ticket and have it ready for mailing.

The usual lead time for customers who request their tickets by mail is several days, primarily because manual ticket delivery is a complicated procedure involving many clerical steps and several reservations officials, Garcia explained.

Although he said the system has performed "very nicely" during its first two weeks of tests, Garcia declined to speculate on the viability of the ticket-by-mail concept. Braniff officials supervising the tests will delay their evaluations and recommendations until all the results become available in mid-November, Garcia explained.

Even if the system does go into regular service, however, it will print tickets for only about 70 customers a day, "a relatively small percentage" of Braniff's total daily volume here, Garcia admitted.

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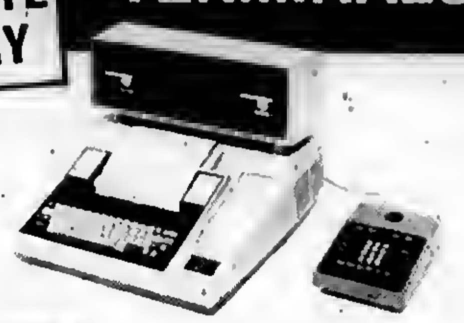

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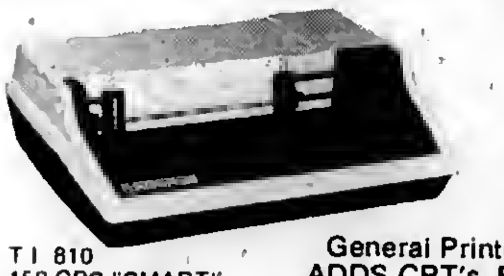

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Seattle Public Library Service Puts Researchers, Sources in Touch

By Robert L. Glass
Special to CW

SEATTLE — Somewhere up in the Seattle Public Library, there's a computer terminal chattering away, querying an information data base.

It's a new service, a pilot project. Seattle's library is one of a few public libraries across the country utilizing computer-assisted information services. Via this service, public users may obtain all references in a fairly broad information bank to a topic or set of topics on which they are doing research.

Say, for instance, that one is interested in information on the penguin and pelican populations in Paraguay. Feeding those topics into the information system would result in the printout of a bibliography of relevant references.

Terminal Location

Terminals to support the system are located in the science/business, education and history departments of the downtown library as well as at the Municipal Reference Library in Seattle Municipal Building. Management of the system is located in the history department because, according to department head Jean Coberly, she is the only librarian with background in computer-assisted information.

Similar systems have been tried or are being tried in a few other public locations across the country (their use in industry and the academic world are by now more commonplace). The San Francisco Bay areas libraries, for instance, pioneered the service three or four years ago via a National Science Foundation grant to Lockheed Aircraft Co.

A study of the usage showed that as long as it was free, it flourished, primarily with job — and school-related queries. But when a charge of $5-15 per query was instated, usage plummeted and has only gradually come back. A similar system in Brooklyn was recently discontinued because of its cost ($60,000 per year) and the New York City financial crunch.

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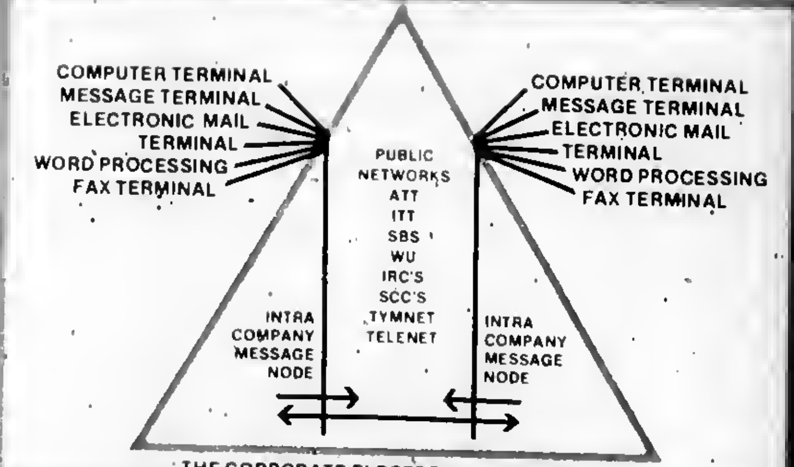

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Speakers and Topics

[illegible] Citibank [illegible] their present span of control 40% and save some $35 [illegible] electronic mail.

II **Howard Anderson. The Yankee Group's** research data base shows startling new applications in computer based message systems, word/data processing, and sub minute fax. New technologies like laser printing, optical scanning and digital switching will affect the market for electronic mail. The need for **non simultaneous** communication

[illegible] IBM [illegible] What have been their own [illegible]

IV **Dr. James Carlisle. Office Systems Planning.** An expert in computer based systems and office automation, he will discuss work done at Rand, Weyerhaeuser and the sociological, organizational and technical implications. Case studies and examples.

[illegible]

VI **Harold Betcher. The United States Postal Service** has one overwhelming strength - distribution and one obvious weakness - transmission. USPS has sponsored several important research contracts into electronic mail and what they mean for the postal service.

[illegible] Digital Equipment Corporation [illegible] onto which it will hook electronic mail [illegible] $20 [illegible]

VIII **Richard Burtis. Corning** is combining their facsimile system with word processing today for an electronic mail backbone, a method which will supplant other less cost justified methods of data, order, and message entry

[illegible] Wiltek [illegible] Yankee Group has received from its users. It built the [illegible] What are the needs of the sophisticated user?

X **Stu Mathieson. Telenet** is a public packet switched common carrier. Before electronic mail must come communications and **packet switching** is the most promising and innovative technology, combining data and electronic mail to reduce the cost of both. **AT & T's Bell Data Network (BDN).**

Bob Benn[illegible], Westinghouse [illegible] methods of implementing Electronic Mail. Mr. Bennis will discuss where [illegible] International Applications.

XII **Dr. Charles Jackson, Subcommittee on Telecommunications, U.S. House of Representatives** has written several important articles on the subject, the most recent being, "Electronic Mail: What it is, What Might it Be." Previously he was Special Assistant to Walter Hinchman, the FCC's Common Carrier Bureau Chief.

[illegible] Satellite Business Systems [illegible] digital satellite transmission system whereby large users and user [illegible] demand basis, and reducing their cost below $.04/transmitted page.

XIV **Pete La Presto. Procter and Gamble** remains skeptical of the need for electronic mail - and they may be more indicative of reality. What has been the results of their studies so far?

[illegible] The National Aeronautics and Space Administration [illegible] in teleconferencing, one variation of electronic mail

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Predicts Probability of Solution

Program Helping Police Budget Crime Time

By Ann Dooley
CW Staff

SAN DIEGO — 'The Streets of San Francisco'' are kept free of crime and "Kojak" always catches the crook, but in real life the police don't solve all their cases because they are often too busy.

Investigators at the San Diego Police Department (SDPD) are assigned 30 new cases each day and only have time to investigate a few of them, so many crimes are never solved and the criminals go free.

But, the odds may soon change in favor of the police. A crime analysis program, developed by Lawrence Livermore Laboratory (LLL) and now being tested by the San Diego police, may help solve as many as 30% more crimes.

Predicts Solution

Given clues about a crime, the computer system is programmed to predict the probability of solving that crime. If there is a high probability of a solution, the investigator will follow it up; if not, he will pursue another case, Lt. Jack McQueeney of the SDPD explained.

The system is being tested on burglaries initially and ultimately will be used for all violent crimes.

Before developing the system, LLL researchers examined 100 crimes involving robbery, assault, burglary, rape and grand theft in the San Diego area. Testing with limited information such as the hour, the season and location of the crimes plus several other factors, the system proved 65% accurate in predicting whether the crimes had been solved.

Next, data on 700 burglaries was entered into the system. This information included the kind of residence or business where the crime took place, the burglary tools used, cash value of stolen property and data on witnesses, suspects and the get-away vehicle, as well as the area of the city and whether serialized property was taken.

With the additional information, the computer developed more significant patterns of data and predicted crime solution with 70% to 95% accuracy.

Previously, the decision to follow up on a case was made on an intuitive basis. Police sergeants who assigned cases to investigators were never sure if they were using the same set of criteria in assigning them or if they were using their own set of rules, McQueeney said.

Test Results Soon

The standardization of the decision process should increase reliability and allow an evaluation of the success rate, he said, adding the idea is not, however, to take the final judgment away from the police investigator.

Eventually the program will be used by investigators accessing the city's IBM 370/158 or be investigators in the field entering the data into hand held calculators, McQueeney said.

But right now, the system is being tested for efficiency and, most importantly, for accuracy. By the end of October, test results will be compiled to determine how the program's success rate compares with the success rate of investigators in the field solving the cases. If the recommendations of the computer differ from the solved crimes, further testing and additional variables will be added.

Will It Work?

It is critical to determine whether the system is predicting a crime can be solved when in reality the chances of solving it are small or, even worse, when it is indicating a crime cannot be solved when the chances for solution are good, McQueeney said.

There will probably be a debugging period to find out why there are discrepancies between the automated and human methods, but if all goes well the system should be operational by Nov. 1, according to McQueeney.

Now the SDPD has a success rate of 19% for solving crimes and with the possible 30% gain in crime solution the computer could provide, investigators will be solving more cases and at the same time solving them more quickly, McQueeney said.

The success prediction model and another system currently being developed will both be entered into SDPD's computer system, the Automated Regional Justice Information System (Arjis), which is being developed under a $2.5 million grant from the Justice Department's Law Enforcement Assistance Administration.

LLL, expert in "pattern recognition" techniques, also has created a system that could be used to predict time and location of crime waves, McQueeney said.

Using standard regression analysis techniques, the system can predict where, what season of the year and what hour of the day a crime will occur, according to McQueeney.

Crimes already committed are broken into areas or police beats and weekly time samples are compared with the yearly average in crime. The information can be graphically displayed on a CRT with a city map showing the month, day and season.

Once high crime times are predicted in an area, more police can be assigned to cover the spot. Eventually the crime area will be refined so it can be narrowed down to as small an area as one city block, McQueeney said.

User Suing NCR for $3.2 Million Receives January Date in Court

By Molly Upton
CW Staff

PITTSBURGH, Pa. — Jan. 9 has been set as the opening date in the case of Tri-State Engineering, Inc. vs. NCR Corp. in the Court of Common Pleas of Allegheny County.

Tri-State is seeking damages of $3.2 million in a suit charging NCR with breach of warranty, negligence and misrepresentation. An NCR spokesman said the firm declined to comment on current litigation.

The damages involve the cost of a Century 200 amounting to $322,075, a loss of about $1.5 million in profits, loss of service bureau business and the additional cost of borrowing, plus the costs of supporting the system with personnel and supplies and peripherals, according to Tri-State's attorney, Jack Plowman of Plowman and Spiegel.

The additional cost of borrowing stemmed from the fact that since Tri-State could not retrieve its financial statements from the system, it had to change its source of borrowing, Plowman explained.

Conversion Planned

Tri-State, a manufacturer of wire mesh containers for the material handling industry, operated a service bureau on its IBM 360/20 and intended to move all its internal and external DP operations over to the Century 200, according to Gary Graham, assistant to the president.

The firm installed the Century in August 1970 and attempted to run in parallel through about three quarters of 1972, he said.

The Century 200 is now in storage and is for sale, Plowman said. Graham indicated the firm now has a Univac 9600.

The complaint, filed in 1973, alleges the Century 200 was not merchantable. The suit focuses on hardware reliability problems, such as head crashes on the disk drive and problems with the card random access memory unit as well as with the printer and memory, Plowman said.

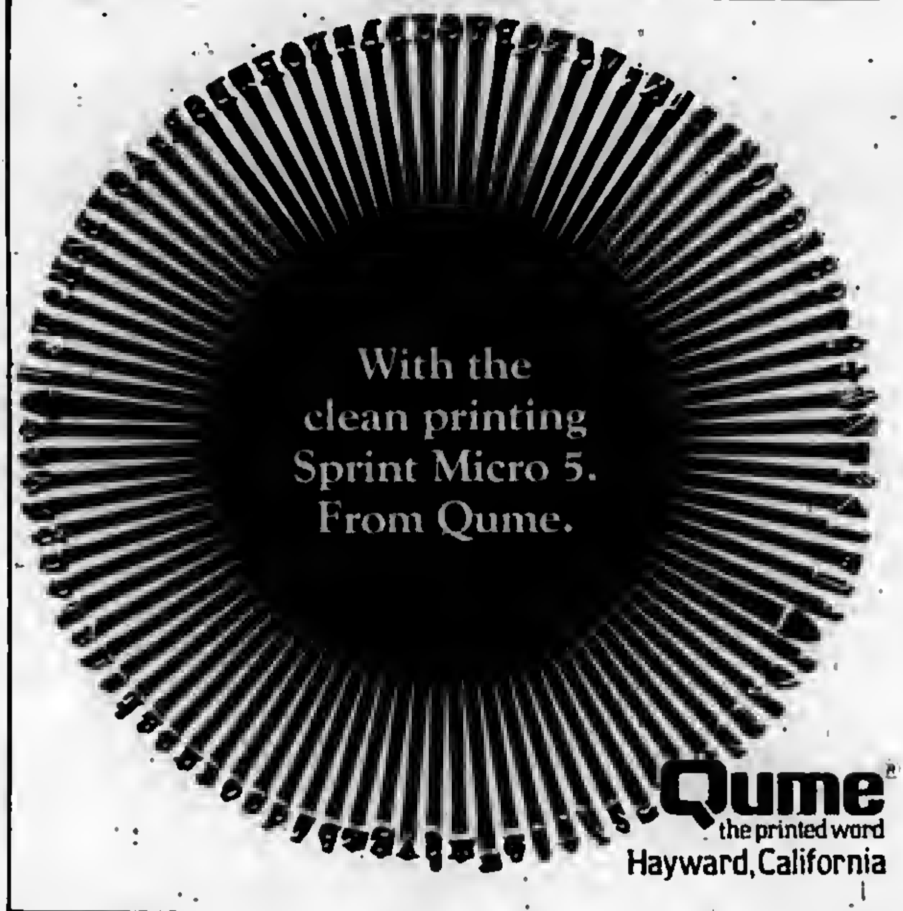
Furthermore, the complaint stated, the system was not "fit and sufficient for the purposes of Tri-State [and] would not operate properly within the temperature range of 60° to 100°F and a range of 28% to 88% relative humidity," as NCR had claimed.

Training Inadequate

NCR also failed to provide, as agreed, full and proper training of Tri-State personnel in the operation of the system as well as technical assistance necessary to apply the system to Tri-State's business, the complaint said.

NCR designed and manufactured the system in such a way as to permit it to "malfunction and issue incorrect information" which was not perceived by normal operational safeguards and checks, Tri-State said.

Also there was no adequate backup system to prevent the unintentional destruction of input, the complaint said.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Despite Improved Services

DDP Can Bring Organizational Conflict: Glaser

By Don Leavitt
CW Staff

LOS ANGELES — Despite a number of obvious benefits, distributed data processing may lead to various management concerns and organizational problems, according to George Glaser, president of Centigram Corp. and a past president of the American Federation of Information Processing Societies.

Won't life be easier when all the users are satisfied? Won't systems work better if input data is clean before it leaves the users' hands? Won't hardware costs go down as we supplant big (but inefficient and awkward) CPUs with new slick minis and micros? Yes, to all three questions, he told the annual meeting of the Society for Management Information Systems (SMIS). But there are hazards, he added.

Glaser noted it is "risky" to offer any definition for "distributed processing" but the usual idea is to move hardware out while keeping control cental. In general, distributed DP can improve the quality of services to the organization, he acknowledged.

In addition, costs for DP would be more visible and under better control; since they'd be in the functional unit's budget, "right where they belong," Glaser continued.

The hardware certainly exists now to support distributed processing, he said. In fact, "if you ask any DP manager how many minis his oganization already has, all you'll get will be silly smiles and nervous laughs," he said, amid a lot of silly smiles and nervous laughs.

In general, Glaser said he favors decentralization, but only when it does not conflict with the organization's goals. Hardware and software choices can now affect management philosophy, and software is the biggest stumbling block at the moment, he told the MIS directors. Many of the minis just don't have the software to manage files effectively if they were to be decentralized, he warned.

The centralization-decentalization decision is often as much a matter of luck as anything else, he said, but once the decision has been made to distribute the processing previously done in a central center, there are a whole lot of questions that demand answers.

Who, he asked, will set the direction for DP overall? Who will choose the hardware and software? Who will do the programming? And, who will set standards throughout the organization?

Perhaps most important, he added, is the question "who will decide all the 'who' questions?"

In fact, Glaser continued, top management must make the decisions and the DP technicians must be heard, but primarily in their roles as experts on available hardware and software. Clearly, DP management already in charge of a centralized operation "may have a bias" regarding the wisdom of breaking up its empire.

Worse Problems

All the classic management problems will be more severe if an organization decides to decentralize its DP. An organization that is highly centralized in all its other operations will find it difficult to decentralize; a highly decentralized organization will find it hard not to decentralize the DP operation, Glaser said.

The move, if it is made, has to take into account the conflicting or complementary authorities of the functional, technical staffs and the line managers. The first group is responsible for saying "do it this way" while the line staff has to say "do it now."

Ultimately, any activity is a delicate balancing of freedom and order.

On the one hand, freedom as illustrated by distributed processing is appealing — "but anarchy is not," he added. Order, perhaps represented by centralized operations, can be appealing, but carried to extremes it becomes bureaucracy, "which has no appeal," Glaser concluded.

DP Library to Assist Chemistry Students

HOBOKEN, N.J. — A computer resource library for problems relating to chemistry is being established at Stevens Institute of Technology here with a $24,700 grant from the National Science Foundation (NSF).

When completed next June, the system will make programs available to help students solve problems in general, analytical, organic and inorganic chemistry.

NSF support came through its Local Course Improvement Program.

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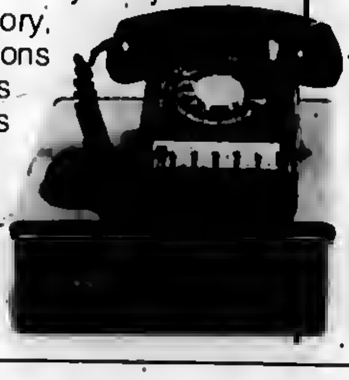

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Modern-Day Paul Bunyan

System Helps Feed, House Remote Workers

SEATTLE — If you've ever run out of food on a picnic, you can't help but wonder how one would go about feeding workers on oil rigs in the North Sea or at construction sites in remote corners of the earth for days and weeks at a time.

Universal Services, Inc., a firm specializing in food, housing and recreational facilities for contractors at such sites, does it with "computerized efficiency," according to George Hiddleston, founder and president of the firm.

Feeding and housing hundreds of such workers in the most unlikely places requires some of the ingenuity of Paul Bunyan and his acre-size frying pan, but they also take the backing of a sophisticated organization," Hiddleston added.

"We have a Honeywell computer to help us plan our menus and purchases in a very precise manner," he said. "We run menus through the computer, which then spits out the purchase orders. And it also helps us control inventory.

"Instead of having, say, $1 million in inventory floating around the globe, the computer can cut it by one-quarter and we do a better job," Hiddleston said.

The inventory and purchase applications initially were implemented in February 1976 on a Model 2020 computer that had been installed the previous fall. Because business has grown and computer applications are being added, the company installed a Honeywell Level 62 system last May.

According to Robert H. Pederson, Universal Services' director of information systems, "One warehouse in Alaska had a three-month inventory that we cut down to one month. Now we are hoping to get it down to two weeks. And we've also made dramatic improvements in our other two Alaskan and two Gulf of Mexico warehouses."

Location Size

The locations serviced by each distribution center generally range in size from five persons — geologists making summer surveys in tent camps in Alaska, for example — to the 500 men per camp on the Alaska Pipeline construction project. The typical camp size is about 50.

Food usage reports for all the camps served by a warehouse are compiled together on the computer. An average planning cycle consists of menus to feed 700 persons for eight months, Pederson said.

The computer then produces purchase orders from the menu data.

"The first set of orders is actually recommendations for our purchasing department," he said. "Purchasing reviews them and makes whatever changes are necessary, such as increasing certain quantities for a new contingent of workers or changing a vendor. Then final orders are printed and mailed.

"The computer handles some 1,200 items, most of which are ordered from about 25 vendors.

"It's more economical for our North Sea operation to order its goods directly from our Edinburgh and Aberdeen warehouses, so we handle only their accounting and reports here," Pederson said.

The DP department, which in addition to Pederson consists of one systems analyst/-programmer, one operator and two keypunch operators, began conversion of the Model 2020 programs in December 1976 so they were ready to run when the Honeywell Level 62 system was installed in May of this year. There was no parallel operation of systems. Initial applications included accounts payable and receivable and general ledger in addition to the inventory. The department also installed a new Level 62 payroll system for handling about 600 checks per week.

The Level 62 configuration includes 96K words of main memory, 80 Mbytes of disk storage capacity, a 500 card/-min card reader and a 400 line/min line printer.

"Next we plan to install some terminals in our accounting department, and one each in the Anchorage, New Orleans and Morgan City, La., warehouses so we can begin on-line operations sometime next year," Pederson said.

"On-line order entry should shorten the lead time by about a week — eliminating mailing time from the warehouse to Seattle and then the extra work of having another person keypunch them into the system," he said.

"We moved to the Level 62 because it offered us the most economic growth path — for moving to on-line systems and adding other applications as well as increasing capacity as the business grows."

Subzero Weather, Anyone?

NOVOSIBIRSK, USSR — Wanted: Programmers for Siberia. Must be able to withstand harsh living conditions.

Would such an advertisement ever tickle your fancy? If so, Soviet scientists compiling computerized profiles of successful settlers may make your dream come true.

The research to find people able to cope with the severe climate and conditions there is being carried on by the Siberian branch of the Soviet Academy of Medical Science, according to an Associated Press article.

It is part of what is described as an ambitious multidisciplinary research program on human adaptation which is being given a priority in Soviet medical science comparable with that given to cancer research in the U.S.

Observers estimate half of all Soviet workers who move to Siberia leave after three years, while one out of five depart within one year. Yet the area is rich in natural resources that require settlers to develop them. The computerized profiles may help the government select workers more suited for that climate, thus reducing turnover.

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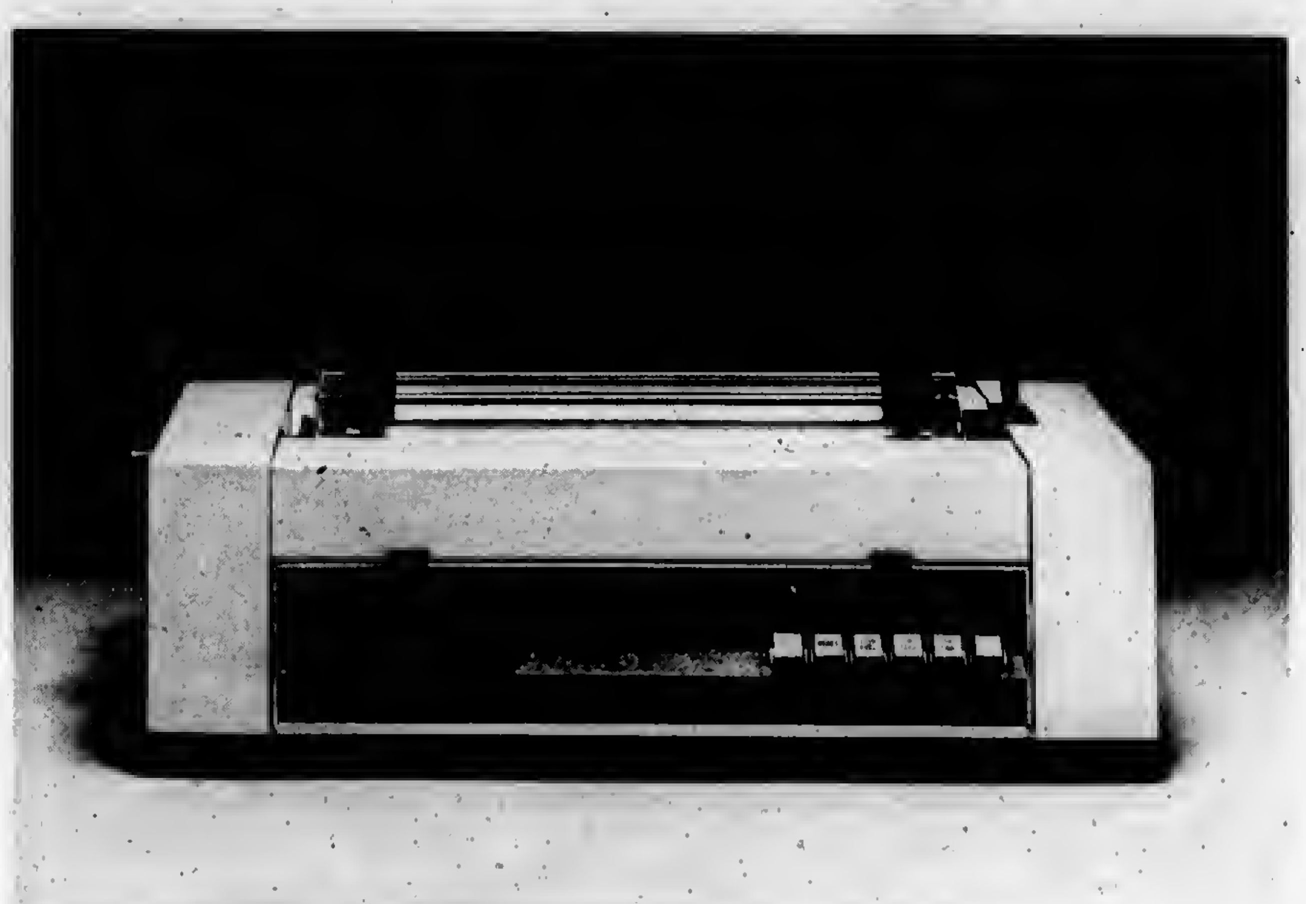

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Editorial

Attention: Micro Users

Microcomputers seem to be one of the current rages in compufing today, yet the impact of micros is very difficult to assess. The questions "Who is using them?" and "What for?" largely remain unanswered.

If you are involved with user-programmable microcomputers, either professionally or as a hobbyist, take a few moments to help us answer these questions. The results of the survey will be published in a future issue of *Computerworld*.

Just fill out the form and return it to us in the prepaid envelope provided in this issue. Please mark "Editorial" on the outside of the envelope.

(1) What is your involvement with microcomputers?
☐ Hobby ☐ Profession ☐ Both

What types of applications do you use the micro for in your profession?
____

(2) What is the approximate value of your system? $ __________

(3) Please describe your system: ____________________
____

(4) What programming language are you currently using (or trying to use)?
____

(5) How did you primarily acquire your system? (Check only onc.)
☐ Computer store ☐ Electronics store
☐ Direct mail ☐ Club
☐ Other __________

(6) How would you hest describe your system?
☐ Homebrew ☐ Turnkey
☐ Kit ☐ Preassembled
☐ Other __________

(7) If your system was a kit, does it operate? ☐ Yes ☐ No
If no, why not? ____________________
If no, do you expect to have it operating ☐ Yes ☐ No

(8) Please rate the following:

	Excellent	Good	Fair	Poor	Does Not Apply
Kit completeness	☐	☐	☐	☐	☐
Kit documentation	☐	☐	☐	☐	☐
Software documentation	☐	☐	☐	☐	☐
Operating documentation	☐	☐	☐	☐	☐
Manufacturer support	☐	☐	☐	☐	☐
Warranty	☐	☐	☐	☐	☐
System design	☐	☐	☐	☐	☐
System performance	☐	☐	☐	☐	☐
Delivery times	☐	☐	☐	☐	☐

(9) Do you own a programmable calculator? ☐ Yes ☐ No
If yes, what models? ____________________

(10) Are you involved with a local microcomputer cluh? ☐ Yes ☐ No

(11) Are you involved with a manufacturer's users group? ☐ Yes ☐ No

Name ____________________
Company (if nonhobbyist) ____________________
Address ____________________
____

Data Past

Five Years Ago
Oct. 11, 1972

WHITE PLAINS, N.Y. — With the announcement of the IBM 370/125, users were able to get virtual memory capability on a 96K real-memory machine for the price of a 32K 360/30. The system continued IBM's trend toward bringing control devices for outside peripherals within the central processor and used independent "satellite" subprocessors to handle program instruction, I/O functions and system diagnostics.

Eight Years Ago
Oct. 15, 1969

WASHINGTON, D.C. — In an unexpected announcement, U.S. Commissioner of Patents William E. Schuyler Jr. told 400 attendees at the second annual Law of Software Conference in Washington that the Patent Office "would consider patent applications for computer programs on the basis of the merits of the specific inventions sought to be protected." This was a sharp reversal from the previous guidelines issued by the Patent Office which, Schuyler said, "discouraged the filing of applications on computer programs."

— — —

WASHINGTON, D.C. — The Internal Revenue Service released guidelines for the tax treatment of the cost of developing, buying or leasing software. The guidelines in Revenue Procedure 69-21 allowed users to either capitalize or expense software development costs.

'What I Need Is a Rearview Mirror!'

Letters to the Editor

Speculating on 3031, 3032

When IBM announces the 3031 and 3032, how will it treat the new wave of speculative orders?

IBM required credit checks and confirmation of credit resources before it would confirm "on-order positions" for company orders for machines for their own use or for leasing to others. Many of these companies extended the limit of their credit in order to confirm these orders.

Will IBM allow these speculative customers to cancel their on-order positions for 3033s and now switch to the 3031 and 3032 by placing new orders? Will it allow more speculative orders in the marketplace? Previously, IBM allowed speculators to take deliveries and put machines in warehouses for weeks to months until they were sold.

George S. McLaughlin
Summit, N.J.

Traffic Complexities

I would like to comment on your front-page article of Sept. 12 which suggested that substantial fuel savings can be achieved by replacing conventional stop lights with computerized traffic control systems.

First, the article was based on a report prepared by Honeywell, Inc., a manufacturer which could well benefit from increased use of computerized traffic control.

Second, urban traffic control is often so poor that any number of alternatives could provide substantial improvements. For example, in many areas of Los Angeles, synchronized traffic lights together with driver awareness of such synchronization could go a long way toward improving traffic flow and fuel economy.

Third, as a driver, I personally find unpredictable traffic lights infuriating; they make it much more difficult for me to optimize my car's gas mileage.

Finally, the use of data from existing traffic situations to generate traffic models ignore one of the most important variables in any traffic situation — the driver. The behavior of drivers can reasonably be expected to vary with the method of traffic control used.

Jay A. Sullivan
Agoura, Calif.

Programmer Tests Valid

I would like to take issue with Jack Wolfe's article, "Are Promising Programmers Slipping By?" [CW, Sept. 12]. I am not supporting total dependence on programmer aptitude tests, but I do think Wolfe's reasons for not using them were illogical.

In my opinion, he made two invalid assumptions. The first is that those persons who score well on timed tests do not work accurately and deliberately. The second is that those who don't score well on speed tests will work with greater precision.

It seems to me someone who scores well on one of these tests demonstrates the ability to be more precise, since he obviously answers more questions correctly.

I have never relied exclusively on a test score in selecting programmers, but an aptitude test is an added criterion in the hiring process when everything else is equal.

I have found that a small percentage of the "careful and deliberate" workers do become capable programmers, but they never perform as well as the "high-scoring" programmer with good work habits.

James W. Gordon
Columbia, S.C.

(Other letters on Page 27.)

Couger Richly Deserves Man-of-Year Prize

By Jack Stone
Special to CW

On Wednesday of this week, the Data Processing Management Association (DPMA) will confer its Computer Science Man-of-the-Year award on Dan Couger. In the nomination form for the award, Dan's supporters began the section on "qualifying contributions" as follows:

"In reviewing the qualifications of all previous recipients of [this] award, we believe our candidate has made a unique contribution — not just to the computer industry, but to American enterprise as a whole. Much more so than previous recipients, his efforts have been 'behind the scenes' — [and] therefore are especially deserving of national recognition.

"Dr. J. Daniel Couger has had more impact on the improvement in education for future managers than any other single individual in the U.S. For [two] decades, computer professionals have decried the lack of managerial involvement in the design of computer-based management information systems. [But] in only a small number of organizations has the desired level of involvement been achieved. An unspoken consensus is that we will have to wait for the next generation of enlightened managers. Dr. Couger's work has produced the environment necessary for that change."

Last month, during a break at a technical symposium in Washington, D.C., a tall, slender sandy-haired fellow outfitted in Western-style garb approached me saying, "Jack, I'm Dan Couger. We haven't met before, but I guess we both sort of write for the same newspaper, although you're slightly more verbose than I am."

"Well, since I couldn't make it as a double E, I'm taking a crack at free-lance writing. In this way, I can yell at a whole population rather than one classroom of students at a time. Let's see now — you do some teaching at a college in the Southwest, don't you? Oh, and you publish some kind of annual bibliography, as I recollect. Wait — I have my standard question for academics: Just why haven't the universities done something, anything, to correct the abysmal lack of DP understanding among managers in U.S. industry?"

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

"Well, I think we've made some progress over the years. But it's going to be a while before the results are discernible. As a matter of fact, I've done some work in the area and have a familiarity with what's going on around the country. If you've got a few minutes, I'll try to fill you in."

When he had finished — the session ran for over an hour because I kept peppering him with questions — I simply went limp. First, I felt like an absolute jackass for drilling him with my preconceived conclusion about the absence of academic efforts. I was way off base.

The Human Connection

Second, as we proceeded with our talk, it dawned on me that the enormous progress that has been made was sparked by his charisma, that the innovations which were so successfully introduced were his ideas (and, man, those university types sometimes can be really hard to move), that the curriculum design and materials were of his creation, that the trained faculty were his former students, and that the primary communication medium for DP in U.S. schools of business (plus untold numbers abroad) is his *Newsletter*.

Third, I was in the presence of the single most dedicated, sincere and hard-working person I have ever met, in or out of the industry, to say nothing of the intellect the man clearly possesses.

Fourth, I had talked with a man who has turned out extremely important work of immense quality, yet who did not evidence the vaguest notion of the meaning of the word "vanity."

To give you just one example of his consistent production, let me describe something of his Business Laboratory for Curriculum Innovation. The lab, located on the campus of the University of Colorado at Colorado Springs (UCCS), was developed as part of a massive curriculum development project that Dan headed. The project involved the structuring of detailed educational objectives in each of the subject areas for the UCCS School of Business undergraduate program.

He built a matrix of successive achievement levels — knowledge, understanding and skill — plotted against subject area.

The lab consists of these elements: The organizational behavior facility has a large lecture room, surrounded by four small rooms which may be observed by the professor through one-way glass, all for the study of group dynamics. There is a self-study section with individual stations where students can easily access a vast storehouse of audio-visual materials to acquire background concepts in all business subjects. (Dan has shown that computer concepts and principles, at least for college students, could be taught effectively through self-study and audio-visual modules. This allows the faculty to spend more time in class on advanced concepts.)

Last, but certainly not the least, is the computing complex with the works — time-sharing, remote batch, small business, programmable calc., you name it.

And what's more, students in the computer-based information systems field utilize all four laboratories. Now, that's progress!

Public Access to Public Systems Hindered

The Taylor Report

By
Alan
Taylor
CDP

Computer systems have some side effects which may turn out to be important — and which may just as likely turn out to be so ineffective as to be unimportant. A particular example of this is where one person has the right of access to the technology of part or all of a system.

In the past, this type of access was basically unimportant because some of the essential knowledge was really in a person's head and not on paper. Even if it was on paper, it could not economically be copied — or references were not able to be made or special equipment was needed. But in the computer age, these barriers no longer exist.

However, it is possible that others may be around which will just as effectively result in the unexpected restriction of access, just as much as the technology of the quill-pen days restricted access.

The matter is important to computer users for a number of reasons. In some cases it may involve them providing data — and in many more it may make valuable data available to them, without having to reinvent the wheel.

That is, provided that the rules for obtaining access to data are known. And here is the rub. So let's watch a case in action.

A computerized health delivery service has been developed over the past few years at the University of Vermont. While the updated details are not currently known, some of the data involved consists of 30,000 displays with vectors connecting them, according to the various rules, with further displays.

The function of these displays is to assist in diagnostic areas; if a person responds to a question on display A that he has trouble hearing, for example, the vector sends him over to display 583 rather than to display 1,257 for the next set of questions.

The amount of work involved in setting up medically correct displays and vectors is quite expensive and it is certainly not the type of thing for which reinventing the wheel is desirable. The work has been supported with tax money and seems to fall under Public Law 93-353, which has clear rules about data access by the public. This law reads:

"The Secretary shall:

"(A) Publish, make available and disseminate, promptly in understandable form and on as broad a basis as practicable, the results of health services research, demonstrations and evaluations undertaken and supported under sections 304 and 305;

"(B) Make available to the public data developed in such research, demonstrations and evaluations; and

"(C) Provide indexing, abstracting, translating, publishing and other services leading to a more effective and timely dissemination of information on health services research, demonstrations and evaluations in health care delivery [to] the general public . . ."

Well, that is about as clear as any law can be, but it hasn't always worked in the past. The items seem to cover just about everything involved, but even final reports of projects were not getting into the files of the appropriate body (the National Center for Health Services Research).

When the General Accounting Office (GAO) investigated the situation over two years ago, it found that 17 out of 36 reports were found anywhere — and only 13 had been submitted to the center. Not a very good record, and one with which the center said it would deal.

James Wechsler, a deputy director of the center, was recently unable to tell me whether the data referenced in the GAO report — including the displays of the computerized system — had been made available.

At the time of the report, the reasons given for not providing the displays were:

- The documentation was written in computer language so only project people could understand it.
- The machines for which the displays were programmed were no longer in use.
- No national repository had been set up to disseminate project displays.

Based upon these arguments, a request made in January 1972 was still not honored in 1976 — and in fact has still not been honored.

This seemed like an instructive case to follow so, at Wechsler's suggestion, a new request is being submitted. Apparently there is no question about the difference between grants and contracts, which may explain the failure to provide the material concerned.

As I see it, the hole in this area is that the center has not required the people seeking and obtaining grants under the act to agree to furnish the material. In any case, it will be interesting to everybody to find out just what laws like this mean or do not mean. It could save some installations millions of unnecessary dollars and years of time.

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FBI's System Has Proved Its Worth

Reader Commentary

The following was originally sent to Donald Edwards, chairman of the House Judiciary Committee.

By Jerome J. Daunt
Special to CW

The article captioned "Study Questions Worth of NCIC" [CW, Sept. 12] utilized a "study" performed by the Scientists Institute for Public Information. The "study" amounted to one afternoon of interviews with FBI and National Crime Information Center (NCIC) personnel in an area in which the Scientists Institute for Public Information has no creditable experience.

According to the article, the "study" found that for such "a vast system, containing over six and one-half million records with 250,000 transactions per day, the 'hit' ratio was not demonstrated to be impressive."

It was stated, "The maintenance of the huge NCIC system, growing every year, may be subject to question when there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement, and [when] comparable information may be available by other means, at cheaper cost and with less significant problems involving intergovernmental relations."

In the first place, the NCIC system is not limited to the FBI/NCIC computers in Washington, D.C. The NCIC system has over 55 computer interfaces with state and other federal law enforcement systems.

Furthermore, there are over 100 municipal, county and regional computer-based systems linked to the states and NCIC. In all, there are almost 30,000 remote terminals in local, state and federal law enforcement agencies linked to the NCIC system in a logical relationship.

Collectively, there are many, many times the number of records stored in these local and state computer-based systems than appear on the national file at NCIC. Obviously, the NCIC system is built on levels of information, namely local, state and national, which was the intent of the designers of 1966.

Furthermore, the comparison of 250,000 transactions a day is invalid in determining a "hit" ratio since many of those transactions are new record entries, cancellations of records or modifications of existing records.

Let's face it, 1,000 hits a day — positive responses resulting in the arrest of an offender, the recovery of stolen property and/or the solution of a crime — are impressive. The data stored in NCIC serves as a check against interstate mobility of wanted persons and movement of stolen property.

Collectively, many more hits are made daily in the related local, state and federal computer-based systems. NCIC data bases serve as a national index to complement state and local systems to counter interstate criminal mobility, which has been well documented over the years in Uniform Crime Reports.

Without a national index like NCIC, the local and state systems would be grossly inadequate.

Purpose of NCIC

It would be absurd to expect much more than a 2% hit ratio against a national index. Police make an inquiry on a person, license plate or other piece of property, and it should be understood that the vast majority of citizens are not wanted for a crime nor that the vehicle is stolen.

A "no record" response, however, is not useless information because it assists the officer in making a quick, intelligent decision to take no further action. The purpose of NCIC and its related systems has always been rapid response of accurate and pertinent information for law enforcement.

The "study" stated there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement. History and experience have shown that, if a voluntary system like NCIC is not beneficial, then it will not be used.

On the contrary, NCIC use measured by daily transactions from local, state and federal agencies continues to increase dramatically. If the benefits were not significant, obviously the use of the system would remain static or, more reasonably, decline.

This alleged "study" suggested that comparable information may be available "by other means, at cheaper cost and with less significant problems involving intergovernmental relations." Law enforcement at all levels will not and should not give up control of its information.

With respect to "other means," there is no turning back from the benefits of computer-based technology. The latter has provided law enforcement with a capability of information and communication exchange that can make our traditional form of law enforcement responsibility work much better.

With regard to "significant problems involving intergovernmental relations," NCIC was planned, designed and implemented by municipal, county, state and federal law enforcement representatives in 1966. NCIC was the first computer-based system to link local, state and federal governments in 1967.

In scope, size, complexity and philosophy, NCIC is still a model for other intergovernmental systems. The law enforcement community obviously had no "significant problems" or it could not have achieved this success.

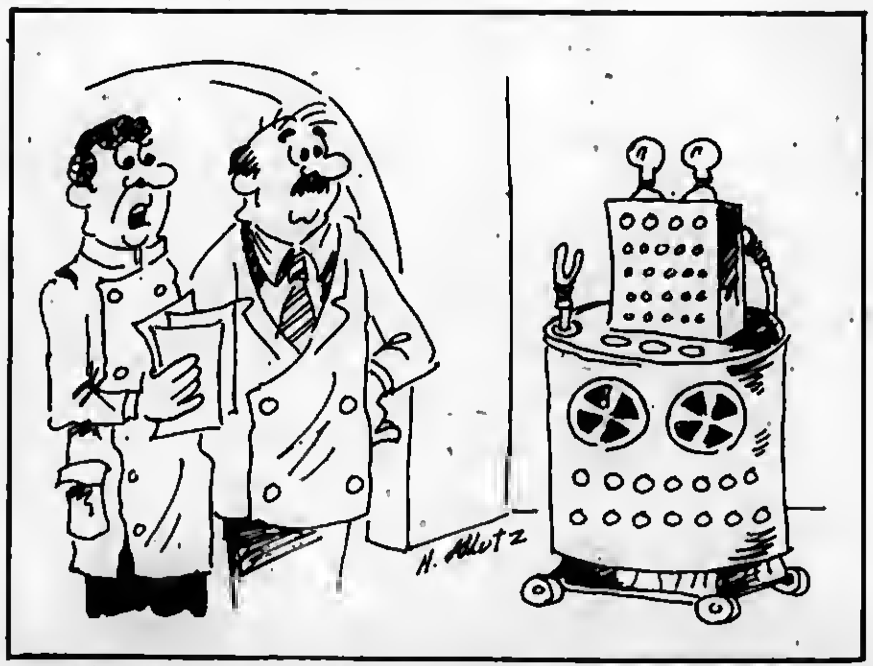
This is based on the fact that law enforcement at all levels of government has had a history of working together to reach national goals.

In conclusion, the NCIC system has provan cost-effective in eliminating the requirement for many thousands of police agencies to manually index information from outside their jurisdiction, saved police officers' lives, solved crimes across state lines, recovered stolen property across state lines and prevented felons from committing more crimes across state lines by early apprehension.

The cost of nationwide duplicate indexing alone more than justifies the cost benefits of NCIC. More important are the intangibles such as lives, prevention of additional crimes and reduced investigative costs due to the NCIC system.

Our way of life, namely local and state responsibility for law enforcement, demands the optimum use of computer technology as designed in the NCIC system.

Daunt is with User Systems, Inc. in Falls Church, Va.



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Letters to the Editor

The Real Purpose of DP

The CW editorial of Sept. 26, "Alternatives Growing," contained what I feel is a continuing misunderstanding about the role of DP in a corporation. Although the editorial focused on the expanding product offerings of OEM mainframes and peripherals, the reader was encouraged to investigate these alternatives ". . . because it should be the responsibility of all DP shops to look carefully at any method of possibly reducing costs."

I believe this objective is only half of the equation. The real purpose of DP is to improve the productivity of the corporation — simply measured as "output" divided by "input." DP affects output by implementing automated systems which make hundreds or thousands of bank tellers, claims processors, reservation clerks, etc. more productive in accomplishing the corporation's goals.

However, application system development in large DP installations has dwindled to a trickle of new systems. Computer programming is largely an individual craft and continues to defy managerial attempts to shape it into a measurable, controllable process.

You are right that ". . . DP operations are often criticized for their high costs." However, I believe you lead the DP director to the wrong conclusion. A "high cost" must be measured relative to the expected benefit. A $5 typewriter costs more than a $4 pencil; however, the output of the pencil makes its cost look enormous, while the typewriter at $5 is an outstanding price performer.

The point is, the criticism for high DP costs is a result of the generally poor performance of DP in delivering useful application systems.

But the DP director who is unable to increase or even maintain the "output," looks to the "input" half of the equation to try to rescue a sagging productivity ratio. "If I can cut my costs, then my productivity ratio will improve, and the corporation will think I've done well," the DP director hopes, and your editorial encourages.

This approach not only ignores the "output" half of the equation but focuses attention on the smallest piece of the "input" half. Hardware costs are less than 30% of most DP budgets and are expected to be only 10% by 1985. Swapping hardware around to save 10% has a net effect of only 3% on the DP budget today and will shrink to 1% in the future. However, a 10% productivity improvement in the systems and programming staff would be worth 7% of the DP budget today and 9% in the future.

While the DP director should be informed on the applicable product offerings of all vendors, your editorial places far too great an emphasis on cost reduction as the role of DP. All hardware products from all vendors continue to improve in performance at a reduction in cost.

Sooner or later, the DP director must face up to the real problem: No matter how far he cuts his hardware budget, until he begins to deliver new, useful application systems, he will continue to be called on the "corporate carpet" for "excessive costs."

Dale W. Saville
Charlotte, N.C.

A 'Dumb' Controversy

The Jeff Murphy's, Joe Rigo's and others akin in thought have been writing anticertification tripe for years, and Computer*world* continues to print it. The pro- vs. anticertification controvesy is dumb. If you will allow an appropriate paraphrase to a tiresome subject: "Those who can, do — and become accredited; those who can't throw brickbats at those who can — by attacking accreditation.

The Certificate in Data Processing (CDP) and the Certificate in Computer Programming (CCP) testing procedures are not intended to "prove" competence where none exists, nor are they designed to "prove" any hot-shot bit-fiddler is moral.

Rather, they are an integral part of a program which allows those who would call themselves "professional" to demonstrate to all that they are not only competent but willing to be held responsible and accountable for their actions as professionals. 'Nuff said.

Robert R. Cromer
Dallas, Texas

SNA Misconceptions

The editorial of Sept. 5 on Systems Network Architecture (SNA) contains a number of misconceptions, both about SNA's design and its acceptance in the marketplace.

A substantial number of IBM customers in the U.S. are running production applications with SNA. Others are performing preproduction system tests. Of those with fully implemented SNA networks, most report they are achieving the performance and economic benefits they expected.

You suggest that SNA may be "ahead of its time." But it is vital that an architectural framework for the rapidly growing field of data communications look to the future — both to maintain flexibility to accommodate new technologies and to provide customers with a blueprint for long-range planning.

The actual implementation of such an architecture will necessarily be an evolving process, and SNA is designed specifically to incorporate change with little, if any, impact on customer applications. IBM has announced many enhancements to SNA during the past three years, and we expect to continue to do so.

Just as IBM's architecture for System 360 and System 370 made possible the orderly evolution of central processor operations, we believe SNA provides the flexibility to meet our customers' needs.

Terry R. Lautenbach
President
Data Processing Division
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White Plains, N.Y.

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COMPETITION	CULPRIT
Two input files maximum.	Handles up to 256 input files simultaneously.
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Complex reports hard to code.	Same thought and coding efforts regardless of complexity.
Maximum 15 numeric fields automatically bucketed.	No limit to numeric fields that can be automatically bucketed.
Data exceptions stop runs.	Data exceptions caught and documented without aborting run.
Card order vital.	Card order not important, except for multiple file reports.
Limited headers. Titles on two lines maximum; column headings on three.	Can use as many as eight differently formatted header lines, which can double as title lines.
Bit fields hard to check; can't be referenced individually.	Bit fields easier, less confusing to handle. Report requestor can define bit strings at will.
Maximum 1128 bytes for working storage fields.	Can define work fields that use over 32,000 bytes for alphanumeric and 32,000 bytes for numeric work fields.
Numeric constants require overpunching.	Numeric constants coded easily (negative one codes as "−1"). No multi - punching necessary.
Limited subscripting of work fields. Uses addresses not subscripts.	Can define workfield tables with limited numbers of table entries, and subscript or index through such workfields. Workfields can be numeric or alphanumeric.
No sorting with multiple-file reports.	Full sorting with multiple-file reports. Each report is independent and can use CULPRIT's full range.
Control (break) fields not quantitative.	Control fields can be quantitative or non-quantitative. Can be both workfields and input fields.

COMPETITION	CULPRIT
Fixed length sort. Entire input record is extracted.	Variable length sort for greater efficiency.
Match files. Designed more for file management than reporting. Producing reports against multiple input more complicated.	Retrieves information from multiple files simply. No added technical ability needed by requestor.
Database interface assumes much DBMS knowledge.	Interface models have been efficiently coded so non-experts can easily retrieve information.
Error diagnostics not complete or helpful.	Error diagnostics clearly indicate what action is needed to correct the parameter cards.
Cannot sort on workfields.	20 sort fields for any given report can be either workfields or input fields.
No descending sort.	Permits either ascending or descending sort for any sort field.

For the full analysis of CULPRIT and the competitor (by name), and for complete data on report generating systems in general, complete this coupon, or give us a call.

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General Warns SMIS:

Rigid Criteria Block MIS Effectiveness

By Don Leavitt
CW Staff

LOS ANGELES — Management information systems make it possible for individuals working in an organization to improve their productivity, but a large number of such systems do not provide the full measure of potential organizational productivity improvement of which they are capable, according to Major Gen. Jack L. Hancock.

The commanding general of the U.S. Army Computer Systems Command said he sees two primary reasons for this situation. First, many systems are based on "user requirements" which are not, in fact, the real requirements at all, but are just the requirements believed to be valid at the beginning of the design phase.

Second, he told a session at the recent Society for Management Information Systems (SMIS) conference here, after implementation when the user finds the original requirements were invalid or incomplete, he starts the systems into the "interminable repair, enhance and improve" mode of maintenance work "which is so costly and frustrating to all."

Current calls for better tools by which the designer can compensate for inadequately stated user requirements and for improved means by which the user can state his requirements clearly and consistently are important activities, Hancock said, "but they fail to attack the real problem."

That problem, he continued, is simply that the user is incapable of knowing his requirements "with the specificity that we, as designers, must have in the application of traditional design methodologies."

And that's not the users' fault. "Organizations today are so complex and their management so difficult, a manager cannot be expected to fully identify systems requirements at the outset of the design process . . . Decision making is probably more an art today than it was a half century ago."

It is little wonder the user responds in one of three ways when asked what he needs from a system, Hancock said. The answer is either "I don't know," "I need just what I get right now, but I need it to be more acurate and more timely" or "I need everything you can give me."

Even from such starts, "User requirements" can be developed including a well-planned long-range development program aimed at a modular improvement on an orderly basis. But such predefined requirements cannot cope with "those changes, almost extemporaneous in nature, which we are forced to make after implementation to either correct system deficiencies or make the system more responsive to the user."

Instead, Hancock recommended that designers particularly look at ways to improve the ability of the user to specify those requirements he believes to be valid early in the process, but to withold commitment to all other requirements until he in a position to validate them.

In effect, this approach shortens the feedback cycle so that changes can be made during development rather than after initial implementation. It also means the "wall" that has come between DP analysts and functional analysts has to be removed so the two specialties can again be integrated, he added.

Better Tools

But they need better tools, too, Babcock noted. Perhaps most importantly, these might include simulators by which users and designers could foresee the volume of work and the size of files that might be generated by initially proposed inputs, processing steps and output requirements.

Some work in this area is being done at Ohio State Universtiy and at the University of California, he acknowledged..

A "breadboard" approach, somewhat similar to traditional hardware breadboarding, might be useful too, he added, but the software breadboard he has in mind is quite different from older concepts that used the same name.

Hancock's breadboard would be a programming product developed with almost no thought to programming efficiency, computer runtime or cost effectiveness of the breadboard per se. Key modules In the system would be programmed in a language which may not even be the langauge ultimately used to produce the real system.

The breadboard work would be a quick-and-dirty effort designed to produce an operating model pattern after the user requirements, but the entire system need not be "breadboarded." The breadboard would not be a final specification and the user together, to certify the validity of the concept as a basis for producing final specifications.

Hancock stressed that the breadboard work would be "throw-away" code, displayed to the user so he could approve, disapprove or request changes. After all changes are made and the breadboard approved, it goes to the final design and programming team to be used in preparing final specifications and creating the production mode programs.

Decsystem-20 Users Can Build On-Line Code With 'Traffic-20'

MARLBOROUGH, Mass. — The Transaction Routing and Form Formatting In Cobol (Traffic-20) package from Digital Equipment Corp. is a collection of general purpose routines for developing on-line applications in a Decsystem-20 environment.

Using the communications capabilities of the Tops-20 operating system, users of Traffic-20 can access any local or remote terminal, he said, adding that Traffic-20 should be "ideal" for such tasks as data entry or order entry, inventory control, order processing or production control.

Traffic-20 consists of two subroutines. The Transaction Routing Routines (TRR-20) let user programs route transactions received from various terminals to the appropriate transaction processing jobs. The Transaction Formatting Routines (TFR-20) can be used to display predefined forms and to move data to and from the display.

In a TRR-20 operation, an order entry transaction may for example, involve routing and processing by three separate jobs; one that verifies the status of an existing order; a second that enters a new order (by accessing a customer file and a production file); and a third job that updates the new order and inventory files.

Traffic-20 requires 2.5K words of memory in addition to the user's application code. The software is available for $5,000 from DEC's Large Computer Group, 200 Forest St., Marlborough, Mass. 01752.

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MDS Uses PDMS to Boost Programmer Productivity

By Ernie Burnett
Special to CW

HERKIMER, N.Y. — Corporate data processing at Mohawk Data Sciences has "stretched" its DP dollars during 1977 by providing the programming staff with a tool to improve productivity.

With internal DP systems running on an IBM 360/65 under Extended Disk Operating System (Edos) from The Computer Software Co., it was only natural to be extremely interested in the Program Development and Maintenance System (PDMS) when it was made available from the same vendor.

PDMS utilizes, as its base, a very efficient Partitioned Data Set (PDS) library that never needs to be reorganized or condensed. Included in PDMS is powerful command structure that provides the normal backup restore and update plus the ability to transfer blocks of code from one PDS member to another and a sophisticated character string manipulation processor.

PDMS extended the programming systems support software by bringing source program maintenance, JCL maintenance and testing to the programmer via IBM 3270-type video display tubes. Not only does the system allow programmers to update programs and other card-image type members in a PDS library, but it allows direct interface to an enhanced assembler, ANS Cobol compiler and linkage editor which can also access the PDS library.

Working with the extended spooling facility of Edos, the programmer can enter jobs directly into the spooler and can capture printer or punch output for interrogation, recatalog as a new member from the output "Q" back into a PDS, or delete the data from the "Q." This direct interface with the spooler eliminates some of the trips between the programmer's work area and the computer room.

It should be obvious at this point that with our staff of 12 programmer/-analysts using five CRTs, we have greatly improved the responsiveness to our users and have provided much quicker turnaround for program and JCL maintenance. We have also been pleasantly surprised many times by the capabilities of this system.

For example, we were recently required to change the branch office number scheme in our Field Inventory System. This required putting the same new logic into 75 Cobol programs. Using our old IBM source library system, the job was, with one programmer, estimated at five weeks to get the changes in. Using the "Split-Screen" update of PDMS (upper half in display mode the lower half in conversational update mode) blocks of code were transferred directly from the top to the bottom of the screen and therefore into the program being updated.

It is difficult to put tangible dollar savings on this type of environment, but with emphasis being placed on making efficient use of existing resources, in this case programmer productivity, PDMS has improved our working environment, generated more interest and has proven to be an attractive price/performance product.

Burnett is manager of software support at Mohawk Data Sciences Corp.

'Syncsort' Found Most Popular

WALTHAM, Mass. — The Syncsort package from Whitlow Computer Systems, Inc. is now the most popular vendor-supplied sort on IBM OS and OS/VS systems in the U.S., according to a study conducted recently by International Data Corp. (IDC).

As of July 1, 1977, Syncsort was installed on 1,333 (or 43%) of the estimated 3,100 such computer systems in this country. Not included in the survey were sort users in other countries, where Whitlow claimed to have 300 more installations.

At the same time, the study estimated, IBM-supplied sort routines were installed in 1,643 or 53% of the U.S. OS and OS/VS sites. This overall total is made up of 992 sites that use IBM's 5740-SM1, 465 that use 5734-SM1 and an additional 186 still working with SM023.

The survey itself involved telephone interviews with 139 sites which were known to be using at least one IBM system operating under OS or OS/VS. Drawn from IDC's data file, this sample was considered large enough to provide a valid statistical base for any conclusions.

IDC's researchers successfully interviewed 132 computer sites which had a total of 201 IBM systems working in the target environments. Seven of the sites initially contacted declined to respond to the survey.

The direct results of the survey showed six sites that did not use any vendor-supplied sorting software. Of the remaining 195 CPUs, 84 used Syncsort; 62 worked with 5740-SM1; 29 had 5734-SM1; and 12 utilized SM023. Another eight used CA-Sort from Computer Associates.

By extension, IDC determined that about 100 of the 3,200 OS and OS/VS sites in the U.S. do not go to outside vendors for sorting support.

Copies of the report may be obtained from Whitlow Computer at 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Support Added To Control/IMS

SUNNYVALE, Calif. — The Control/IMS utilization and accounting system for IBM IMS/360 or IMS/-VS operations has been upgraded by Boole & Babbage, Inc. (B&B) to support IMS/VS Release 1.1.4. The added support is similar to what was introduced earlier for IMS/VS Release 1.3, according to a B&B spokesman.

To provide the backing needed for IMS/VS 1.1.4, nine modules were updated in Control/IMS: most of the changes were in the Vsam and Isam/-Osam buffer control modules, he added.

Cost of Control/IMS is $17,000 per site, B&B said from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Two more high performance systems extend the new NCR 8000 series.

The NCR Interactive I-8430 and I-8230.

With these two new computer systems, NCR has now introduced six major current technology computer models in 1977. And there are still more to come.

These new systems offer more alternatives and greater productivity for many businesses and organizations. And NCR's migration path engineering offers unlimited growth potential. Because compatibility—protection against obsolescence or increasing volume—continues to be an essential feature of NCR system design. Every user can move up from the I-8230, the I-8430, or any other NCR I-8000 system.

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The I-8430 uses NCR's powerful IRX (Interactive Resource Executive) operating system, and functions in the virtual memory multiprogramming mode. IRX is an easy step up from IMOS III (Interactive Multiprogramming Operating System); the operating system used by NCR's I-8200 Series. No reprogramming; not even recompiling. And a step toward the Criterion Series. That is migration path engineering.

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The second new system is the NCR I-8230, a powerful and flexible minicomputer system designed for small-scale autotransaction applications. Or for use as a local processor in a distributed processor network.

Using IMOS III, the I-8230 can run multiple interactive applications online from terminal work stations, eliminating redundant data entry and ensuring that file information is always as current as the last realtime transaction to enter the system.

For a personal introduction to this new high performance twosome of new computers, call your local NCR representative. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

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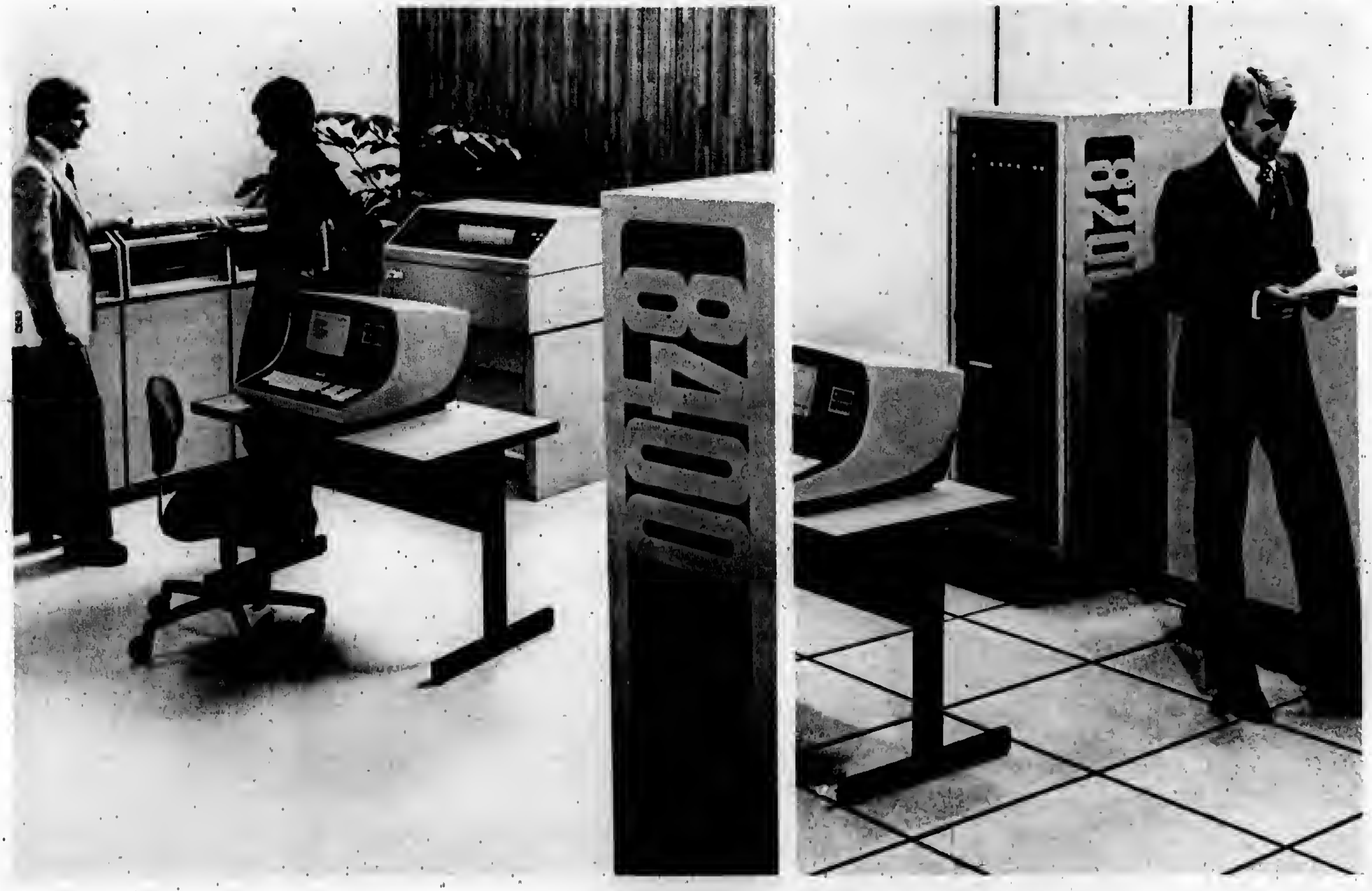

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Total Efficiency Up 15%

Monitor Helps Firm Tune Hardware, Software

LONDON, Ontario — Even with an IBM 370/168 VS system, the ability to ensure maximum performance and optimize resources is a prime concern at London Life Insurance Co. here, according to Ronald W. Murray, the company's senior technical analyst.

The company acquired the 370/168 in September 1973 because its workload had outstripped the capacity of its 360/50 and 360/65. Based on its operating history and present trend, the workload should continue to grow at a rate of 5% to 9% as the company expands into new insurance areas.

To ensure the system is operating at its peak and all resources are being properly allocated, Murray and his group run Boole & Babbage's Configuration Utilization Evaluator (CUE) software monitoring system every time a new application is added and at least once a month to "tune" the hardware.

"We use the monitor to assist us in isolating heavy page rate areas and to ensure they are being handled properly," he commented. "It also assists us in making certain we have fairly equal device utilization and proper placement of our data sets on particular volumes."

Murray noted proper channel utilization has been an area of key concern as well as a common source of problems for London Life. "Shortly after our system was on line and operating, we used CUE and, after studying the reports, we found our channels were out of balance by about 20%," he said. "After making some software adjustments, we were able to balance the channels and achieve much better throughput from the system."

Murray commented that visual monitoring of the system and its operation is extremely difficult because of the length of time necessary for observation before any determinations can be made.

However, with a good software monitor they are able to run the monitor on the system and receive condensed time reports to provide the objective overview statement.

The CPU and I/O overlap reports have been of considerable assistance to Murray's team because they let them see what is going on over the specific channels. He said that with only simple changes they have been making significant savings in this area by keeping the CPU use at its optimum and by reducing waiting periods. "We've found that it was easy to improve our efficiency by 10%," he commented.

In addition to handling hardware problems, the software monitor has assisted London Life by pointing out some of their software problems.

"In one instance, we had a particularly high average page service time per request, about 125 msec," he stated. "By studying the reports we could see where the problems occurred and, by tracing the software back against the reports, we located the specific program locations which were causing the problems. Then with a few very minor program rewrites, we eliminated the software bottleneck and were able to reduce our average service time per request down to 70 msec."

All in all, Murray estimated the software monitor has assisted his department in improving the system's efficiency by 15%.

"We've also found that channels, our need for direct access, and our volume activity during certain periods will dramatically affect the system's efficiency. If you don't keep on top of it constantly, your system's efficiency can drop by as much as 10% in less than a week.

"The IBM VS system has many overall and individual advantages for firms such as ours involved in a multitude of areas," Murray said, "but it requires a greater degree of sophisticated monitoring and measuring to ensure that it provides those advantages to us and our customers."

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'Surv02' Uses RPG-II to Run Survey Studies

PORTLAND, Ore. — Surv02 is the second generation of a market survey analysis program for use by nonsystems marketing researchers. Originally developed for Proctor & Gamble, it can be used on any CPU that supports RPG or RPG II, according to the current marketer, Centauri Corp.

The survey analysis is done by the software in accordance with control parameters entered by the researcher. As many as 99 separate analyses can be handled in a single run of the program and each analysis may be based on as many as 999 interviews, with up to 91 six-way multiple choice questions in each interview, the spokesman said.

The researcher shapes the report desired through three basic operations. First is the selection of interviews (from all the interviews in the survey file) to be used for the particular study. The criteria for selection may be as complex as need be, he added.

The second operation is the tallying, of the interviews selected, of actual responses of each type occurring for each question in a particular report.

The third step is the determination of percentages, corresponding to each tally, with respect to any one of four possible bases for percentage to be used for a particular report.

These bases are the number of interviews in the complete file, the number selected, an arbitrary number or a special count from among all interviews in the survey file of those satisfying the conditions specified for this purpose, the spokesman explained.

A supply of formatted sheets for entering interview data as well as instructions for entering the control parameters are included in the users manual that accompanies the RPG-II source code..

Surv02 requires about 14K bytes of main memory, a multifunction card unit, disk and printer, and it costs $3,750, Centauri said from 7250 S.W. 34th, Portland, Ore. 97219.

Seminars Show Two Levels Of CICS Programming

HAWTHORNE, N.J. — CICS application programming will be the subject of two different five-day seminars offered by On-Line Software International (OSI) in different areas across the country this autumn and winter.

A lecture/lab course provides Cobol or PL/I programmers with the knowledge necessary to code, debug and execute a CICS/VS application using the command level interface available with CICS/VS Release 1.3. The commands and their functions are discussed along with application design considerations, OSI said.

Another course provides the Assembler, Cobol or PL/I programmer with all the tools — familiarity with the available facilities and an understanding of how to apply them — to program a CICS application at the macro level, the firm said.

One presentation of this course is underway now in Chicago; another will be in Boston starting Nov. 7; a third, in the New York area on Jan. 16.

OSI charges $500 per person for attendance at its five-day courses, the spokesman added from Software Plaza, Route 208, Hawthorne, N.J. 07506.

STSC Plans to Serve 13 Nations This Year

BETHESDA, Md. — Scientific Time-Sharing Corp. (STSC) has announced plans to offer its APL-based time-sharing services on an international basis. Local access is already available in seven countries, but this will grow to 13 nations before year end, according to the company.

The extended network will encompass much of Western Europe, Canada, Mexico as well as Hong Kong and the U.S., including Puerto Rico. Access to the STSC Amdahl 470V/6 located here will be by local call from the user's offices, a spokesman added.

The company's international operations are being implemented from its New York City office located at 747 Third Ave., New York, N.Y.

Seminar Set to Cover Accounts Payable

NEW YORK — The average company overpays one out of every 10 bills it receives, according to the brochure advertising the American Management Associations seminar on "Developing Computer Systems for Accounts Payable."

The three-day course will be presented in Atlanta the end of this month, in New York in November and in Los Angeles in December.

The agenda starts with the systems planning phase of a payable conversion, moves into detailed considerations of such things as analyses of vendor invoice terms and matching of invoice/receiver and purchase orders, before closing with a review of management reports.

The registration fee is $460 for Association members and $530 for others, the association said from 135 W. 50th St., New York, N.Y. 10020.

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'Planits' Generate Formats

TULSA, Okla. — Two similar programs, Planit-S and Planit-P, allow the user of an NCR 8200 to enter format parameters through a CRT. These parameters are stored as a source language and may be listed, modified and saved in an Editor-compatible text file, according to the vendor, Sage Computers, Inc.

The user enters statements in an interactive mode and can test print for intermediate results. Planit-S offers a SHOW command which allows the user to display a dummy screen on a CRT, to see exactly how the proposed screen will appear, even before any programming is done.

Planit-P works similarly, except that it generates formats for reports, Sage explained. The user can tell the system to right-justify a field ending in a given column, left-justify a field or center a field.

The advantage continues, the spokesman asserted, during development since programmers "can see very clearly" what is necessary to generate a given screen or report format. That also cuts down on the modifications so typically needed after a system has been installed, he added.

Planit is available for $850. It is also available in combination with the firm's Fastbol and Cobol precompiler and Xref cross-reference generator for $1,200, the company said from 2323 S. Sheridan Road, Tulsa, Okla. 74129.

'Stars' Schedules Resources, Shows On-Line Job Status

CHERRY HILL, N.J. — The Status and Revision System (Stars) software, developed by Value Computing, Inc. (VCI) as a "natural extension" of the company's computer and data center scheduling packages, is already in use in various IBM OS/VS environments.

Both the System III Scheduler and the Data Center Scheduling System were designed to schedule resources to produce the best job mix for a shift or a day in advance, he explained. System III is limited to a single CPU, whereas the data center scheduler works with all the CPUs and all other work locations within the data center.

Until now, neither really had a facility to ease the revision of schedules such as almost any center faces from time to time. But Stars tackles that problem: It provides on-line status information of jobs being procesed as well as a method of revising the original schedule when it has become obsolete.

With Stars operations, management can receive current actual data compared to schedule job statistics.

Stars is said to be synchronized in real time to work actually underway, feeding up-to-the-minute status reports back into the Value scheduling algorithm, which then produces a revised plan. The system can be used in single- or multiple-CPU environments, the spokesman added.

The VCI scheduling packages range from $11,000 to $24,000. The Stars extension costs an additional $6,000 for the first CPU and $2,000 more for each additional system to a maximum of $10,000, the company said from 300 VCI Bldg., W. Marlton Pike, Cherry Hill, N.J. 08002.

Update Handles NOW Acounts

OAK BROOK, Ill. — The Demand Deposit/Credit Reserve System from Weiland Computer Group has been enhanced so that it now does more than combine demand deposit accounting with an integral credit reserve feature, commercial account analysis and descriptive/combined statement features, the vendor said.

The multibank/multibranch system has been updated to include negotiable order of withdrawal (NOW) accounting capabilities and GIRO-type interest calculation on negative balances.

The software runs on IBM 360/370 under DOS, with CICS required for optional on-line operations. The basic package costs $34,000 and the on-line capability adds another $10,000. An account reconciliation module costs an additional $7,500.

Weiland is at Suite 101, 814 Commerce Drive, Oak Brook, Ill. 60521.

Japanese Users Get Call/370

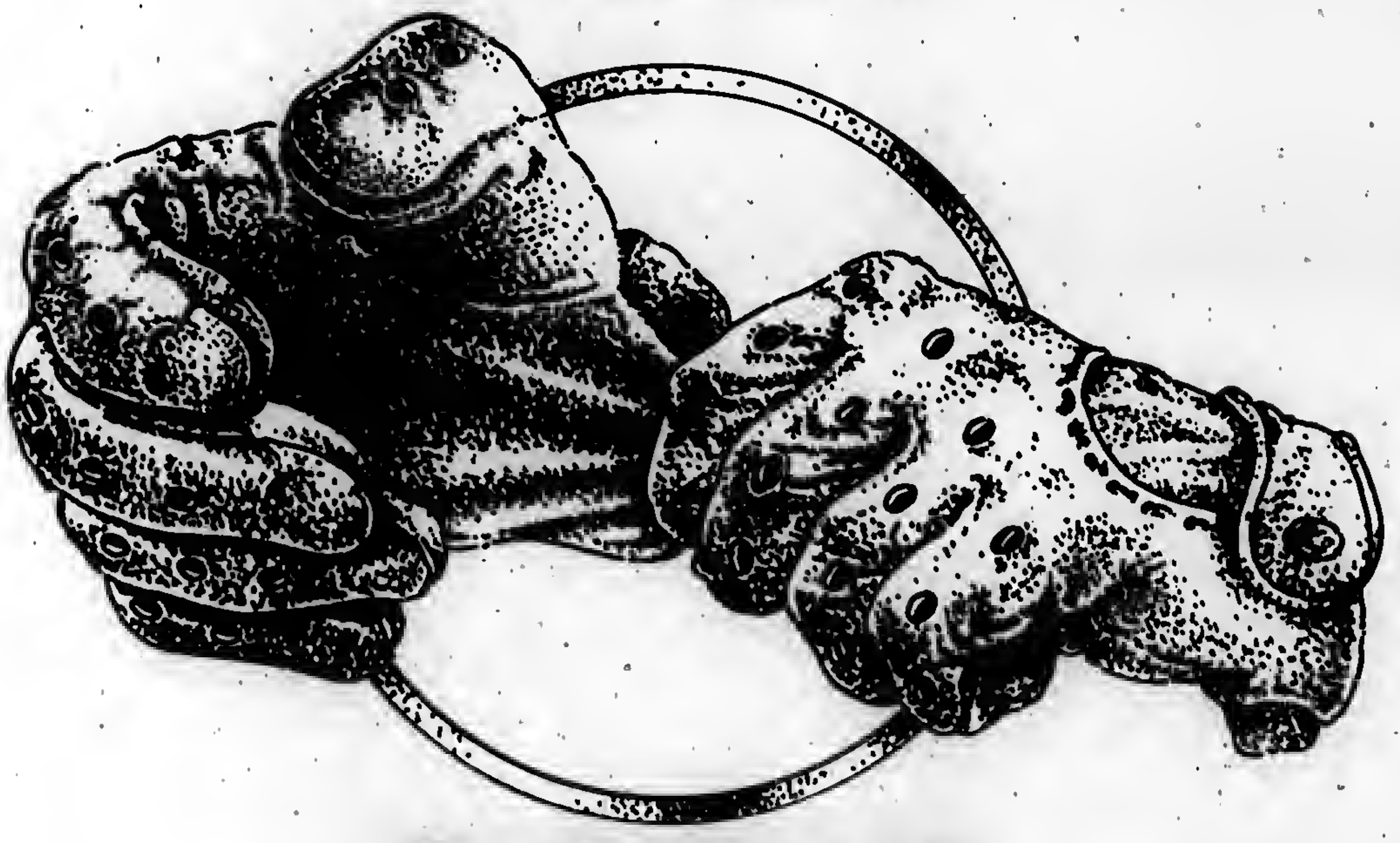
GREENWICH, Conn. — Companies in Japan can now join those in the U.S., Canada and Western Europe as users of Control Data Corp.'s Call/370 Management Time-Sharing Service, a CDC spokesman said recently.

The service allows users to share comon data bases and to share programs for such tasks as monthly financial consolidations, sales comparisons and analyses and management reporting systems.

Data Services Far East, Inc., a CDC subsidiary with marketing and support personnel in Tokyo, is responsible for marketing the service in Japan.

Offered by the Service Bureau Co., another CDC division in this country, Call/370 is known as Call/CDC in Canada and most European countries by other CDC units.

The Service Bureau Co. is at 500 W. Putnam Ave., Greenwich, Conn. 06830.



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On National Issues

TCA Called 'Unique' for Speaking Out

SAN DIEGO — The Tele-Communications Association (TCA) has become the first multi-industry user association to take a position on a national issue, according to Daniel Grove, newly elected TCA president.

Speaking at a recent conference here, Grove explained that the user group had decided to speak out on national issues because "if we didn't represent the voice of the user, no one would."

Grove was referring to the recent position taken by TCA which supports competition in telecommunications and opposes the concepts of the Consumer Communications Reform Act. "Our ability to effectively manage the telecommunications resource for our respective employers will largely be determined by decisions that may soon be made in Washington," Grove said.

'Unique Among Organizations'

TCA is "unique among user organizations" because of a provision in the bylaws that enables the group to express its views on pertinent issues. Most telecomunications user groups have "shied away from this type of activity," Grove said, adding that "we demonstrated that it is possible to obtain a consensus of opinion from a widely diversified membership base."

As a result of the TCA policy of speaking out, a total of 27 man-days has been spent in Washington. This has shown that Washington policy makers are sincerely interested in hearing from users. And until now, there has been a dearth of user input to the legislators, Grove told attendees.

Among the testimony given by TCA members in Washington has been an explanation of the role that telecommunications plays in business and industry; and discussions of problems associated with the level of home telephone rates, he said. Hopefully, the involvement of TCA in legislative issues will continue, he added.

The participation of the TCA in legislative debates is "just a beginning." Previously, the objective of the user group was to educate the membership on changes taking place within the industry. "Now we are actively seeking to affect the outcome," Grove said.

Ferris Nominated To Succeed Wiley

WASHINGTON, D.C. — Charles D. Ferris, general counsel for House Speaker Thomas P. O'Neill Jr., will succeed Richard E. Wiley as chairman of the FCC, if confirmed by the Senate.

Wiley sent his resignation to the White House early in September, stating his intention to be gone from the commmission by the end of this week. He has remained as a commissioner and as chairman of the FCC on an interim basis since his term expired on June 30. Wiley expects to return to the practice of law, sources said here.

Ferris was an aide to the majority leader of the Senate before serving on O'Neill's staff. He was also a research physicist for Sperry Gyroscope in Great Neck, N.Y.

Sycor Offers Display Systems Compatible With IBM 3270s

ANN ARBOR, Mich. — Sycor, Inc. has announced its 290 Series of on-line display systems which is compatible with the IBM 3270 CRT series.

The Sycor 290 systems can reportedly be leased for up to 25% less than the 3270s or purchased at an even greater savings.

Any host computer which can support a 3270 with a 1,920-char. display screen can support a Sycor 290 — with no reprogramming, a Sycor spokesman said.

Terminal operators accustomed to the 3270 will find that the 290 keyboard arrangement, screen size, screen attributes and the operation of the terminal will be "virtually identical," and retraining is not necessary, he said.

The microprocessor-controlled 290 is available in three versions for either remote or local channel use.

Sycor's 291 and 296 remote configurations can use either Binary Synchronous (BSC) or Synchronous Data Link Control (SDLC) line protocols over leased communications facilities at transmission speeds of from 1,200 to 9,600 bit/sec, the firm said.

The 291 remote cluster control unit will accommodate a combination of up to 16 display stations and printers.

The 296 Control Station is a single display which operates as a mini-cluster controller and supports a combination of up to eight display stations and printers.

Like the 291, the 292 local cluster control unit can support up to 16 devices but attaches directly to an IBM 370 channel.

The display station of the 290 systems has a 15-in. screen with a 1,920-char. capacity. It uses a 7 by 9 dot matrix for upper case and a 7 by 12 dot matrix for lower case characters. Additionally, a protective plastic filter reportedly improves contrast and comfort for operators by significantly reducing glare.

Optional features available with the 290 display station include a light pen for multiple-choice applications; a numeric function pad for fast entry of numeric information; a badge reader for operator identification and security; and key locks to secure each station when not in use.

Also available with the 290 models is Sycor's bidirectional, microprocessor-controlled Sprinter printer with speeds of 66-, 120- and 180-char./sec. Sycor maintains complete control over the design and manufacture of the Sprinter printers and has eliminated many of the mechanical parts to assure greater reliability.

(Continued on Page 36)

Articles Requested For CW 'Special' On Data Networks

Networks are no joke. They are serious business to users, with the cost of facilities rising and terminal equipment becoming more complex. Networks and user problems in selecting, configuring and operating them will be covered in a *Computerworld* special report to appear in the Nov. 30 issue.

Articles relating to networks will be considered for inclusion in the special report if received no later than Oct. 21. Length should be about 4-5 pages typed, double-spaced. Stories should be sent to Ron Frank at CW, 797 Washington St., Newton, Mass. 02160.

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multiplexers

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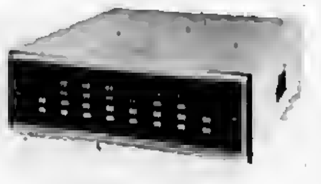

Data rates: Mixture of asynchronous channels up to 300 baud
Channels: Maximum of 18 channels
Diagnostics: Remote and local loopback test, busy-out, indicators
Multi-drop: Drop one or more channels at a number of locations
Multiple access: Multi-drop channels have equal opportunity for processor channel
Line: Dial or dedicated
Options: Voice-plus-data, data regeneration

$465 basic unit
$325 channel end

codex

☐ Series 900 time division multiplexer

Data rates Mixture of synchronous or asynchronous up to the high speed modem aggregate
Channels: Up to 64 channels
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Line conditioning C2 conditioning recommended
Options Auto speed detection, multi-drop

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$152 async channel end

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Grove Chosen To Head TCA

SAN DIEGO — Daniel Grove of Motorola, Inc. was elected president of the Tele-Communications Association at the user group's annual conference here recently.

Harvey Campbell of the University of California at San Diego was elected first vice-president, while Pete Osborne of Rockwell International was made second vice-president of the organization. Tom Buckle of the California state Automobile Association became third vice-president, while Robert Swanson of Credco of Arizona, Inc. was elected secretary and George Lombardo of Transamerica Corp. became treasurer.

TCA directors for the coming year include Bob Barnwell of Fibreboard Corp., Martin Hill of Boeing Co., Keith Sowell of the Arizona Department of Public Safety, Joe Ballestracci of the Los Angeles Board of Education and Mark Mills of Kaiser Permanente.

More than 90 exibitors displayed products and services at the conference and more than 500 members and guests attended the meeting, according to Barnwell, outgoing president.

The 1978 TCA conference will be held Sept. 26-28 in San Diego, it was announced. Information about TCA is available from the TeleCommunications Association, 424 S. Pima Ave., West Covina, Calif. 91790.

SNA Here to Stay: Doll

Special to Computerworld

CHICAGO — IBM's Systems Network Architecture (SNA) is here to stay and might even make an appearance in IBM's distributed processing future, according to Dr. Dixon Doll, President of the DMW Group, Ann Arbor, Mich.

"There is nothing intrinsic to SNA that would prevent the implementation of a lean, mean and hungry version using Series/1 minis, even though such a capability has yet to be announced by IBM," Doll told the 8th Annual Professional Training Conference, sponsored by Advanced Systems, Inc. here recently.

"I don't think SNA is going to die. It's got problems, but they will be worked out, even though it will take a long time. There will be no vacillation by IBM on SNA," he said.

In his overview of trends in data communications and distributed processing, Doll said future network structures will have to assume shapes similar to the structures of user organizations, both hierarchical and linear. That requires functions which will allow organizations to plug into three types of networks, because they are likely to need all three.

He listed intelligent public networks such as the Bell Data Network (BDN) and Telenet, intelligent provided networks such as SNA and Decnet, and what he called "pseudo-public" networks which share users within an industry such as the users of Electronic Funds Transfer Systems by banking.

As for the expected competition for the communications dollar between IBM and AT&T, Doll predicted the telephone company would increase prices in local and metropolitan areas to take advantage of the assumed inability of IBM to address most locations with its proposed satellite telecommunications system.

Unit Monitors Full Duplex Data Streams

ALTAMONTE SPRINGS, Fla. — Availability of a data communications line monitor known as Epiview has been announced by Epicom, Inc. The device accepts full-duplex data in either synchronous or asynchronous modes at communications speeds up to 100,000 bit/sec. Data is displayed in Ascii, Ebcdic or hexadecimal codes on the Epiview built-in CRT. Other line disciplines are optionally available.

In its standard configuration, Epiview displays data on its integral 5-in. CRT, with selected segments accentuated by character blinking and/or reverse imaging. The instrument will also drive a 9-in. or 12-in. auxiliary CRT, which is optionally available.

Epiview can be used to view data stream in real time, or it can be teamed with the Epitape recorder.

Epiview is available in a portable version, and an optional modification kit permits rack-mounting. Single-unit price is $3,300, from Epicom, Inc., 592 N. Douglas Ave., Altamonte Springs, Fla. 32701.

Sycor Systems 3270-Compatible

(Continued from Page 35)

Diagnostic routines are supplied with the 290 systems. They are designed to be used by both nontechnical user personnel and by Sycor service representatives.

The purchase price of a typical 290 configuration including six display stations and a Sprinter printer is $34,980.

Comparable monthly lease rates for one-, two- and three-and-one-half-year contracts are $799, $731 and $639 respectively, including maintenance.

Delivery of 290 systems will begin in the fourth quarter of this year from Sycor, Inc., 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Computer Optics announces a new 3270 feature.

Immediate Delivery

Computer Optics can deliver a complete 3270 replacement installation — CRT displays, remote and local controllers, printers. And we can deliver tomorrow, the next day or as soon as you need it.

Computer Optics is totally dedicated to 3270 series replacement systems.

Minicluster systems that handle up to eight tubes or printers in a remote location. Maxiclusters, either local or remote, for up to 32 tubes or printers on one controller. All are plug-to-plug compatible with IBM equipment.

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Believe. And $5,950 is for a quantity of one. Now you can afford a genuine Datapoint for those applications where computer power was needed but couldn't be cost-justified.

A Real Computer

Don't let the price mislead you. The 1500 contains a powerful fully programmable business computer with 32,000 bytes (8 bits & parity) of memory. Add to that an integral keyboard, video display and dual diskette drives (over 500,000 characters on-line) and you have a complete system. And there's more. A standard, built-in communications interface requires that you add only a modem to start communicating.

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There's much more than just hardware, too. You get a comprehensive Diskette Operating System with a utility library including sort, index and index sequential access method (ISAM), a data entry language (DATAFORM®), a data processing language (DATABUS®). Like all Datapoint systems there's a common, dynamic file structure. No time consuming file format conversion necessary. You start writing application programs immediately.

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The 1500 will communicate in IBM 3780 discipline, or DATAPOLL® for Datapoint-to-Datapoint communications. Auto-answer is standard. You needn't halt an ongoing data entry operation to communicate — with the 1500 you can communicate while an operator continues to enter or process data. Or, you can elect to do concurrent printing on an optional Freedom Printer™.

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You'll find the 1500 full of those features you've always wanted. Inverse video for display highlighting, user program defined function keys, simple installation, and easy operator training. Programs can be remotely loaded from a central site. A system that you can adapt to your needs, not the reverse.

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Each 1500 is backed by the nationwide Datapoint Field Service organization with over 90 service centers. And when you need systems or other technical advice, the Datapoint Account Managers and Systems Engineers are ready to help.

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Olivetti Terminal Bows

NEW YORK — Olivetti Corp. of America introduced the TC808 terminal system oriented to applications requiring interactive or batch communications with optional hard-copy output.

The terminal is reportedly suited to on-line communications users and remote data entry users who require limited terminal intelligence, limited peripheral connections and printed response.

Standard equipment on the TC808 terminal includes a central control unit, a synchronous or asynchronous line control unit which handles a range of communications protocols, and a work station with keyboard and printer.

Protocols supported by the TC808 include Binary Synchronous Communications, the IBM 2980, 2780, 3270 and 2848 terminals, Burroughs TC-500 and TC-700, NCR 270, Univac and Honeywell, a spokesman said. Cassette storage is provided for application programs.

The basic configuration of the TC808 includes 16K of storage, asynchronous or synchronous line control, keyboard and integrated printer for $7,500, he said. Maintenance is $47/mo and options include the 260-char. CRT for $700.

A minimum order is five terminals, the company said. First deliveries are scheduled for the beginning of 1978 from Olivetti Corp. of America, 500 Park Ave., New York, N.Y. 10022.

Dual-Intensity CRT

HIS Expands VIP Family

WALTHAM, Mass. — Honeywell Information Systems has added another model to its Visual Information Projection (VIP) family of display terminals — the VIP 7200.

The asynchronous VIP 7200 features a 1,920-char., dual-intensity display capability. The terminal is designed as a conversational teleprinter-compatible workstation for use with Honeywell's Level 6 minis and other Series 60 systems for such applications as time-sharing with large Level 66 computers. In addition, it can communicate with Series 2000 and 6000 systems.

Typical uses include problem-solving in engineering and scientific environments, program development and low-volume data-entry transaction applications.

The dual-intensity screen provides a lower-intensity projection of information from the computer and a brighter intensity of data being entered by the operator. This is reportedly helpful in fill-in-the-blanks types of applications, such as order entry or inventory control, Honeywell said, since it enables operators to focus on and edit data just entered.

Terminal Transactions

Cursor Movement

Full cursor movement across 24 lines of display is provided. The cursor is both readable and addressable for program-control purposes. The keyboard includes 86 keys arranged in alphanumeric and numeric groups and can generate 128 Ascii codes.

In addition to the alphanumeric, special-character and numeric key pads, seven special-function keys are included on the keyboard as a standard feature.

A scroll capability is provided for single-character transmission in conversational-mode applications such as program development or problem-solving. Buffered transmission for a line or a page (a full screen of 1,920 characters) also is standard, enabling operators to edit data before completing transactions.

Variable Rates

Transmission rates vary at standard increments between 75 and 9,600 bit/-sec. The terminal includes both 20-milliamp current-loop and RS-232C interfaces.

A single VIP 7200 may be purchased for $1,980 or may be leased on a five-year contract for $70/mo, including maintenance.

Omnitec Offers Phone Coupler

PHOENIX — The Omnitec Data Model 702B telephone coupler allows companies to use remote conversational terminals for both computer time-sharing and message communications.

Because most remote computer terminals are used primarily to initiate calls to a computer, they are equipped with originate/only modems. To allow terminal-to-terminal as well as terminal-to-computer communications, the $436 unit can be used as either an originate or answer coupler, the company said.

Simultaneous Outputs

Outputs from both interfaces are available simultaneously, so one 702B coupler can be used to drive a CRT.

Switch selection of full-duplex communication also lets users simultaneously transmit and receive information with one telephone connection, according to Omnitec Data at 2405 S. 20th St., Phoenix, Ariz. 85034.

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Micom Adds Multiplexer, Teletype Error Controller

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced the Model 520 error controller for Teletype Corp.-compatible terminals operating on dial-up lines and a wideband digital multiplexer for applications running at 230.4 Kbit/sec.

The Micom 520 error controller is a "black box" implemented with MOS/-LSI devices that provides automatic retransmission-on-error according to the firm.

A Model 520 is installed at each end of the data link between the teletypewriter or CRT terminal and modem at one end and between the computer port and the modem at the other end, a spokesman explained.

No changes to existing hardware or software are required; data compression is performed to avoid the need for additional overhead on the data link, Micom claimed.

The device can be used with terminals operating asynchronously at speeds to 2,400 bit/sec. It transmits all data in a block format with a cyclic redundancy character check character to detect block errors.

Any block error detected causes automatic retransmission, the spokesman noted.

Typical applications for the error controller include time-sharing services used with programs requiring minimum error rates such as numerical control, statistical analysis, text editing and financial reports; and remote connection of terminals to small business systems with unsophisticated communications capability, according to the firm.

Wideband Multiplexer

Micom's Model 720 digital data multiplexer was designed for channelizing Bell Digital Dataphone Service (DDS) links; but is now being offered for use in wideband multiplexing applications.

The 720 is said to be the only time-division multiplexer available to multiplex synchronous and asynchronous channels, dial-up or dedicated, on both DDS circuits at 56 kbit/sec and wideband analog circuits at 50- or 230.4 kbit/sec.

Systems uptime is maximized with redundant common logic and power supplies; monitoring and fault isolation on the composite high-speed data link are available from either end, according to Micom.

Prices for the multiplexer start at less than $2,000 per terminus. Micom's 520 error controller costs $795, it stated from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Breakout Panel Tests V.35 Link

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has added the Model 80 CCITT V.35 interface/-breakout panel to its Minitest line of diagnostic products.

The Model 80 is a battery-powered, hand-held instrument designed to monitor and break out a standard CCITT V.35 interface between a modem and a terminal, IDS explained.

In use, the V.35 interface cable between the modem and the terminal is plugged into the Model 80. This allows access to all 17 signal conductors specified by CCITT V.35 or Bell 306 interface specifications, IDS said.

The balanced data and clock signals are monitored by a balanced receiver with an LED indicator. Thirteen switches allow all interface signals to be interrupted for testing and monitoring, the company said.

Pins next to each switch allow miniature jumper cables to be used for cross-patching of signals, a spokesman added.

The Model 80 is priced at $990 from IDS at 100 Nashua St., Providence, R.I. 02904.

Infotester Analyzes Modems

PENNSAUKEN, N.J. — The Infotester, a portable test set from Infotron Systems Corp., can analyze the performance of synchronous and asynchronous modems and frequency and time-division multiplexers.

Functions include detection and display of bit and block error rates, determination of request-to-send and clear-to-send turnaround times and measurement of distortions and overspeed variations, according to Infotron.

Panel Control

All front panel controls are arranged for step-by-step operation with nonabbreviated legends. Each knob and switch has only one function, eliminating the confusion caused by a switch having different functions in different modes, the company claimed.

Indicator lights and an LED display are used to display status and test results, it added.

RS-232

The Infotester is RS-232-compatible and operates at all common data rates from 50- to 9,600 bit/sec, or 19.2 kbit/sec with an external clock, according to the firm.

Infotester weighs 24 lbs, is available with an attache case or in a rack-mount version and costs $1,995 from Infotron at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

Fabri-Tek has an ace in the hole for PDP 11/70 users.

The Model 7011 Add-on Core Memory. Totally plug-compatible with the PDP 11/70. Compact expansions up to 2 megabytes in 128K byte increments. Improved performance with cycle time of 650 nanoseconds, access time 250. Parity checks and interleaving are standard features. Plus, of course, the reliability of non-volatile core. With our prices and 30-day delivery, you can't afford not to get in the game.

Fabri-Tek is the only independent to cover the entire DEC PDP 11 Series with both core add-ons and semiconductor add-ins. Whatever your requirement, we'll deal you a winning hand.

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Programmable Units Assist Toyota Dealers

HOUSTON — Toyota is using Texas Instruments, Inc. Model 742 programmable data terminals in an information system that assists dealers in maintaining automotive parts inventory at an optimum level, records vehicle sales and accomplishes dealership accounting.

The dealership program, called "Toyota Automated Controls" (TAC), ensures accuracy of information by prompting specific entries and editing critical item entries such as part numbers, TI said.

The vehicle sales records and dealership accounting module could not have been added to the system without the intelligent terminals, Toyota said. The programmability of the Model 742 terminal has simplified the input of complex and lengthy transactions. Additional applications to assist dealers are being explored by Toyota.

A Toyota dealer enters vehicle sales, parts sales, adjustments and other parts department information on a daily basis. At night, each terminal is polled and the information is entered into the host computer system for processing.

The system provides the dealership with a parts sales record while maintaining a current on-hand amount, on-order quantity, and pricing on each part number.

According to Toyota, the 742 terminal has decreased input time and error rates by about 50%. In addition, the programmability of the Model 742 terminal has reportedly allowed expansion to more complex operations.

CRT Widens Characters

ANN ARBOR, Mich. — The Model 400D CRT from Ann Arbor Terminals, Inc., is now available with a 40-char. line option. which provides double-wide characters.

The terminal's memory stores 2,000 characters in a 50-line by 40-char. format. Twenty-four lines of data are displayed on the monitor at one time: the remaining 26 lines are hidden and can be accessed in either roll or scroll modes, the firm said.

Three character accents — blink, dim and reverse-video — are standard. The cursor is displayed as a blinking field.

Terminal Transactions

RS-232 data interface is standard, with 20mA current-loop optional. A 15-in non-glare screen is integral to the desktop version, as well as RS-170 video output for driving auxiliary monitors. The KSR version features a detachable 72-key keyboard which includes cursor control keys, a separate numeric pad and TTY lock.

Command functions can be executed from either the keyboard or the computer. Commands include erase memory; cursor home, return, up, down, right and left; set cursor X-position; set cursor Y-position; set screen position; and start blink, dim, reverse-video and normal characters, the company said.

In addition, operation controls can be executed from the keyboard. Typing control 0 puts the Model 400D into setup mode, which allows changing of the baud rate (110-9,600), keyboard mode (TTY or full-Ascii), I/O mode (local, full or half-duplex) and display mode (page, roll or scroll).

Price is $845 for the controller only and $1,495 for the complete terminal. Delivery is eight weeks from Ann Arbor Terminals, Inc. 6107 Jackson Road, Ann Arbor, Mich. 48103.

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld.*

In the ten years since Data Base Management Systems were introduced they've grown to a multimillion dollar subindustry in their own right. As late as 1973, less than 1,000 DBMS were installed; but International Data Corp. estimates that over 5,000 are in use today, and this number will increase to 8,200 in the next two years. This phenomenal growth has been fueled by the hoped-for benefits of DBMS, which include increased programmer efficiency, the elimination of redundant information in the data file, and greater ease in coping with system upgrades and reprogramming.

But a data base management system should be evaluated carefully before you commit to purchase. They have developed such a reputation as problem solvers that people tend to expect more from them than they can achieve, while overlooking or minimizing the effort required.

We'll have several experts on hand to help you arrive at a realistic understanding of DBMS in our October 31st special report edited by Don Leavitt. Here is a sampling of the kinds of articles you'll see:

- Combatting the "Holy Grail" syndrome — Being realistic about the benefits that are possible in relation to the effort required; how to assess whether DBMS will enable you to reach your goals.
- How well are installed systems living up to expectations? A review of typical problems that need to be overcome.
- The role of the Data Base Administrator in DBMS — including considerations like the physical arrangement of the data base.
- How dictionary packages, report writers, etc. interface with DBMS software.
- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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For Overall Satisfaction

Users Rate MSI, Data Pathing Units Tops

Equipment	Number of Installations	Number of of Controllers	Number of Input Stations	Weighted Averages and Response Counts*																													
				Overall Satisfaction					Ease of Installation					Ease of Input					Ease of Training					Hardware Reliability					Maintenance				
				WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Portable or Stand-Alone Units																																	
Digitronics Portaverter	3	9	513	3.0	1	1	1	0	3.5	2	1	0	0	3.5	2	1	0	0	3.6	2	1	0	0	2.3	0	2	0	1	1.7	0	0	2	1
MSI 2000, 2100, 2200	6	11	627	3.5	3	3	0	0	3.2	2	3	1	0	3.6	2	4	0	0	3.2	1	4	0	0	3.0	0	5	0	0	3.0	1	3	1	0
Standard Register Source Record Punch	3	—	17	3.3	1	2	0	0	3.3	1	2	0	0	3.0	1	1	1	0	3.0	1	1	1	0	3.0	1	1	1	0	3.0	1	1	1	0
Telxon 916, 919	5	9	182	3.0	1	3	1	0	3.2	2	2	1	0	3.6	2	3	0	0	2.9	1	2	2	0	2.6	1	3	0	1	2.4	1	1	3	0
All others	2	1	16	3.0	0	2	0	0	3.0	0	2	0	0	3.0	0	2	0	0	2.5	0	1	1	0	2.5	0	1	1	0	2.6	0	1	1	0
Total Portable or Stand-Alone Units	19	30	1255	3.2	6	11	2	0	3.3	7	10	2	0	3.3	7	11	1	0	3.1	5	9	4	0	2.6	2	12	2	2	2.6	3	6	6	1
Integrated Systems																																	
Data Pathing Inc.:																																	
150-160 Series	3	4	108	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	3.5	1	1	0	0
2100 Series	5	6	127	3.6	4	1	0	0	3.0	1	3	1	0	3.4	3	2	0	0	3.8	4	1	0	0	3.4	4	0	1	0	3.4	2	3	0	0
Total Data Pathing	6	10	235	3.9	6	1	0	0	3.3	3	3	1	0	3.7	5	2	0	0	3.9	6	1	0	0	3.7	6	0	1	0	3.4	3	4	0	0
IBM Corp.:																																	
Model 367	6	12	52	2.5	0	3	3	0	2.0	0	1	3	1	2.6	0	4	2	0	2.9	1	3	2	0	2.2	0	2	3	1	2.2	1	1	2	2
1030 Series	10	11	93	2.9	1	7	2	0	2.7	2	3	5	0	3.0	3	4	3	0	3.0	3	4	3	0	2.6	2	4	4	0	3.1	4	3	3	0
2790—S/7	3	7	42	3.0	1	1	1	0	2.0	0	1	1	1	3.3	1	2	0	0	3.0	0	3	0	0	2.3	0	2	1	0	2.3	0	2	1	0
Model 5230	7	7	64	3.0	1	5	1	0	3.0	2	3	2	0	3.7	0	5	2	0	2.9	0	6	1	0	3.2	2	3	1	0	2.6	1	3	1	1
IBM other	3	3	46	3.3	1	2	0	0	3.6	2	1	0	0	3.3	2	0	1	0	3.5	2	1	0	0	3.3	1	2	0	0	3.6	2	1	0	0
Total IBM	29	40	297	2.9	4	19	7	0	2.7	6	9	11	2	2.9	6	15	6	0	3.0	6	17	6	0	2.6	5	13	9	1	2.8	9	10	7	3
Singer, all models	4	14	826	3.3	1	2	0	0	3.0	0	3	0	0	3.5	2	2	0	0	3.3	1	3	0	0	2.5	0	2	2	0	2.5	1	0	3	0
All others	5	7	106	2.6	0	4	2	0	2.3	0	4	0	2	2.6	0	4	1	1	3.2	2	3	1	0	3.2	2	4	0	0	2.8	0	5	1	0
Total Integrated Systems	46	71	1462	3.0	11	25	9	0	2.6	9	19	12	4	3.0	11	23	9	1	3.2	15	24	7	0	3.0	13	19	12	1	2.9	12	19	11	3

*Weighted Averages (WA) are calculated on a scale of 4 points for each user response of Excellent (E), 3 for Good (G), 2 for Fair (F), and 1 for Poor (P).

By Frank Vaughan
CW Staff

DELRAN, N.J. — Data collection equipment from MSI Data Corp. and Data Pathing, Inc. received the highest user ratings for overall satisfaction in a recent survey conducted by Datapro Research Corp.

Datapro's report on the results of that survey, "All About Data Collection Equipment," includes ratings from users at 65 installations with installed portable/stand-alone units and integrated systems made up of 101 controllers and 2,717 input stations.

Users were asked to rate their equipment on a scale of 1 to 4 — with 4 representing "excellent" — in the areas of overall satisfaction, ease of installation, ease of input, ease of training, hardware reliability and maintenance. The weighted results are shown in the chart above.

Nineteen installations using portable and stand-alone units responded to the survey. These 19 installations have 30 controllers and 1,255 input stations.

The users rated the MSI Data Corp. models 2000, 2100 and 2200 highest in the area of overall satisfaction. The Digitronics Portaverter, which had the highest ratings in the areas of ease of installation, ease of input and ease of training, received the poorest rating of all equipment evaluated in the area of maintenance.

Forty-six users with integrated systems accounted for 71 controllers and 1,462 input stations. The Data Pathing 150 and 160 series received the highest rating in overall satisfaction as well as in four other areas — ease of installation, input and training and in hardware reliability.

(Continued on Page 42)

College Averts Paper Disaster By Converting Records to COM

LONG BEACH, Calif. — When Long Beach City College (LBCC) here went ahead with its decision to institute a computer output microfilm (COM) system for its student records, it gained an advantage that was hardly expected. It beat a flood.

The college, operating on two main and five extension campuses in addition to 69 satellite centers, had been plagued with the recurring problem of having to search out records dating back as far as 20 years because many adult time-part students take courses at intermittent intervals.

As a result of the need to call up old records, LBCC began generating all new student records on a Sperry Univac 9600 DP system. This took care of current records, but did nothing to alleviate the problem of accessing older ones.

The tasks of converting a huge boiler room full of priceless records into a manageable retrieval system would have been impossible without the use of DP, according to Michael Maas, dean of admissions and records.

The solution was to input the older documents into the 9600 via CRTs and maintain them in memory for six semesters. At the end of that time, a COM service bureau converts the oldest records to 16mm microfilm;

(Continued on Page 48)

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AMA Slates 'DP Crisis' Seminar

NEW YORK – The American Management Associations (AMA) will hold a three-day seminar on "The Crisis in DP Organization: The Impact of Minis, Data Bases and Distributed Systems" here Nov. 7-9.

The seminar will cover the stages of DP growth in a historical perspective; the alternatives for the use of minicomputers; hardware and software differences between large-scale systems and minicomputers; centralized vs. distributed systems; and the impact of data base management systems.

The seminar, which will be held in the Americana Hotel, will be chaired by Jon S. Gould, vice-president and director of applied technology for Citibank here.

Guest speakers will incude Capt. Grace M. Hopper, U.S. Navy; Gary Audin, vice-president of Logica, Inc. here; and Ralph G. Berglund, data communications consultant, Cherry Hill, N.J.

The cost of the seminar is $375 for association members and $430 for nonmembers.

Additional information on the course, catalogued Priority No. 6333-07LC, can be obtained from Karen Johnson, AMA, 135 W. 50th St., New York, N.Y. 10020.

MSI, Data Pathing Units Get Top Honor From Users

(Continued from Page 41)

The data collection equipment most commonly discussed in the report can be termed key entry, source data automation and factory data collection, the report explained.

Key entry was defined in the report as that which is done in batch mode on keypunch equipment. Many users of this method said they desire alternatives, Datapro reported.

Source data automation was described as the capture of data as the byproduct of a conventional business transaction. Optical character readers and/or recording typewriters were seen by users to be the answer for eliminating the need for double keying of business information. This equipment was thought of in terms of a "clean" office or store environment.

Factory data collection is recording data on the shop floor. This is the "dirty" or industrial environment equivalent to source data automation, the report said.

Any organzation that is now operating a factory, warehouse, hotel, truck fleet, school or some other type of business, nonprofit organization or government agency is a potential user of data collection equipment.

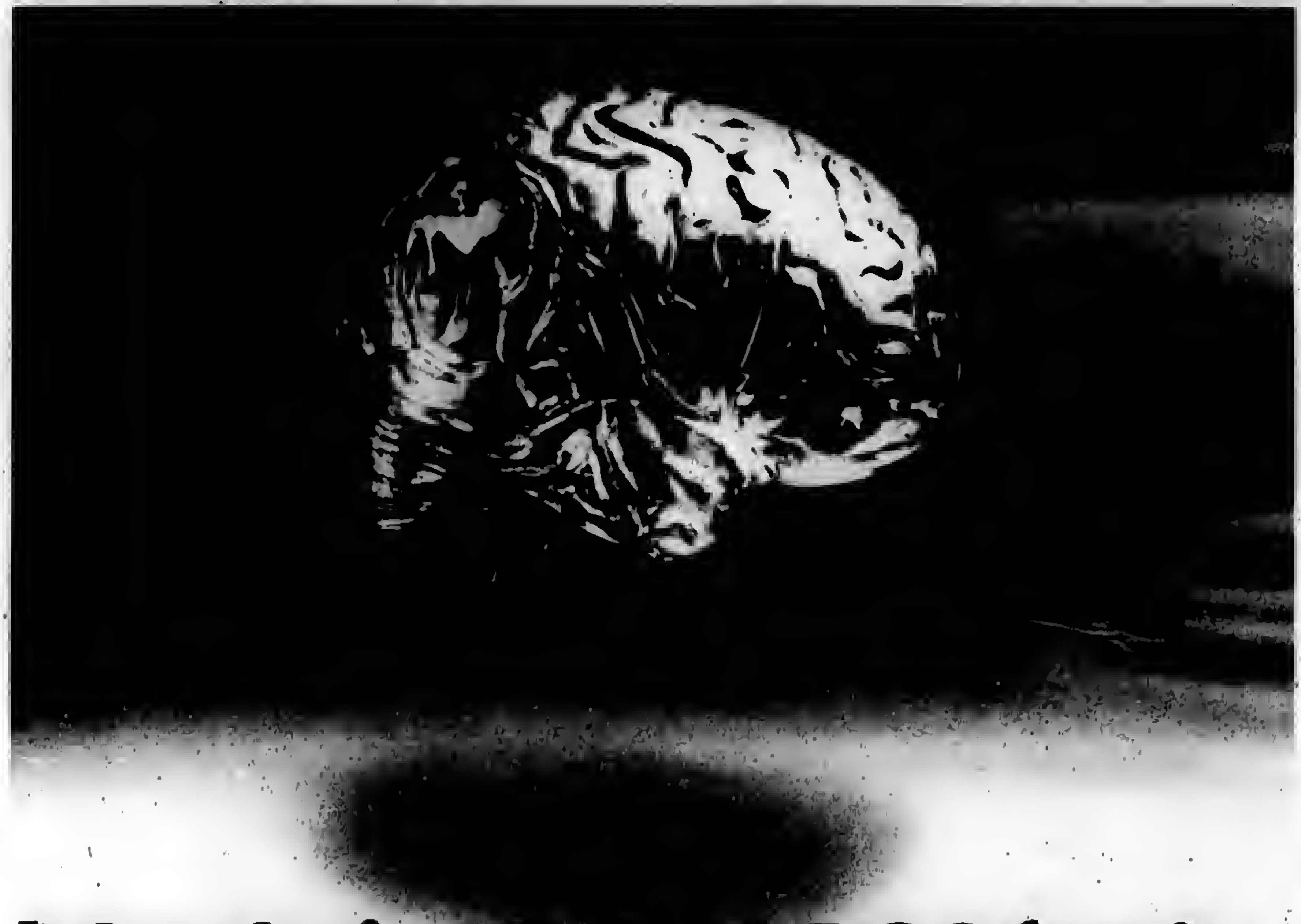
This existing organization is now collecting data about its operations in someway, the report noted, so the question is whether data collection equipment can provide a less costly or more efficient method of collecting.

The organization must also ask whether it can provide the means for collecting more data or more relevant data than the current system.

In the report, equipment listings for portable/stand-alone units contain information on the type of unit, output media, environmental orientation, data input specifications, physical properties, recording devices, prices and availability.

The systems are listed by arrangement, environmental orientation, input station specifications, central controller specifications, pricing and availability.

"All About Data Collection Equipment" is available for $12 from Datapro Research Corp. at 1805 Underwood Blvd., Delran, N.J. 08075.



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On-Line Entry Speeds Chemical Firm's Orders

CINCINNATI, Ohio — Improved customer service, faster and more efficient operations, greater accuracy and better controls are the major benefits claimed by Emery Industries here for its on-line order entry and billing system.

Emery Industries manufactures a variety of spacialty chemicals that are used in different consumer and industrial products. Until recently, the firm operated an order entry system using fan-folded, edge punched cards and punch tape equipment.

To improve operations, the company converted in June 1976 to an automated on-line order entry and billing system called Computer Order Processing at Emery (Cope). An IBM 370/135 system with 192K bytes of main memory with 3270 CRTs and both 3284 and 3286 printers is the heart of the system, which was developed jointly by the DP department and the chemical sales office under the direction of the corporate controller.

Conversion to the system included implementation of a data base/data communications system using an entry level version of Data Langauge/I and the Customer Information Control System (Cics). Conversions were made from DOS to DOS/VS, from 2319 disk drives to 3340 disk drives and from Cobol-D to Ansi Cobol for slightly less than 1,000 programs.

All of this was accomplished along with major revisions to other systems and programs between February 1975 and June 1976. The DP and systems staff at Emery consists of 18 people, divided equally between operations and systems and programming, a spokesman explained.

Three Main Files

The order entry and billing system operates five days a week, using three main files. One is a customer master data base file with name, address, sales, territory and credit data. The master file also contains special instructions relating to product labels, notices of shipment, traffic and standard routings.

Another main file is an open order/-shipment file containing the status of all open orders and several months of shipped orders. This file is tied by invoice number to customer data and by product number to the third major file which contains product numbers, descriptions and codes for special grades or special packaging. All data entered in these files through CRTs is edited for accuracy and completeness by the system.

Orders come to the order entry department where three CRTs and two printers operate. Another CRT and two printers are operated at the Emery manufacturing plant in Cincinnati, while a fifth CRT is used in the company's DP department, the spokesman explained.

Received by phone, mail or teletypewriter, order data is entered on a worksheet. Customer and sales territory numbers are determined from microfiche records. An order entry is called up on a CRT, the customer and sales territory numbers are entered and the customer information is displayed on the screen of the terminal.

While all constant customer information is displayed, the keyboard is then used to enter variable data such as any address change, sales code, order date, customer purchase order number, any changes in credit terms, requested shipping date, routing and freight terms.

Next, a product information screen is displayed which shows data for all products regularly ordered by the customer. Quantities and container codes for each product are entered in the terminal. Then pirces are entered on a price screen and special instructions such as marking, labeling and notice of shipment requirements are selected from a customer instruction review screen. This completes the order entry process.

The bill of lading and all the shipping papers for the order are printed out at Emery's Cincinnati plant. A customer acknowledgement copy is simultaneously printed in the sales department and the order is also stored in the computer system.

When an order is shipped, the Cincinnati plant uses an order shipping screen on the CRT to enter the shipping date, any routing changes and actual quantity shipped. Other information includes vehicle number on a tank car, gross, tare and net shipping weights and an analysis or lot number for each product.

The open order/shipment file is instantly updated and invoices are automatically printed the following day, the spokesman said. Shipping data for three months as well as data on all open orders is then available for inquiry simply by calling it up at a CRT.

Each evening, order status reports are produced for each of the sales territories. All orders received, shipped and billed are listed, denoting any changes from previous reports and listing dates and actual weights of shipments. These reports are mailed to salesmen in each of the territories. An expediting report, showing orders by requested shipping date is also produced daily, in addition to an exception report listing items shipped but not billed and the reason.

Each week, an open-orders-by-product report is generated for use in current production scheduling. Once a month, planned production is entered in the system and compared with

(Continued on Page 48)

Sycor announces that's shamel (Except for

We're proud to introduce an on-line system that offers as much as the big guy's system. For a lot less.

It's the new Sycor 290—a 3270-compatible display system that can save you up to 25% over a three-and-a-half-year lease. And even more when you purchase.

An outgrowth of our long experience with on-line systems, the Sycor 290 is available in remote and local configurations that support up to 16 CRTs and printers in any combination. And in a remote mini-cluster unit that supports a combination of up to eight CRTs and printers.

Remote configurations use either Binary Synchronous (BSC) or Synchronous Data Link Control (SDLC) line protocol at speeds from 1200 to 9600 bps. This fast transmission time allows you to better control your line costs and to configure your network for optimum performance.

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Special diagnostics mean fast service.

Service for the Sycor 290 can be sped up by using our sophisticated diagnostic programs. You can run them to pinpoint problems quickly and easily. And alert the Sycor field engineer to the problem when you call for service. Trouble-shooting is on target from the

Involves Nationwide Net

Shared Processing Brings Significant Savings

By Jerry Tieszen
Special to CW

ORLANDO, Fla. — Martin Marietta Data Systems (MMDS) has saved more then $1 million by consolidating its data processing here on dual IBM 370/168s utilizing the MVS operating system, associated peripheral equipment and a nationwide telecommunications network.

The host center, which began operations here in early 1977, was the culmination of several large interrelated projects, and the resulting savings are being realized by both MMDS's DP customers and by the corporation's dispersed divisions.

In mid-1974, the Orlando data center was providing batch processing (over the counter and remote job entry), interative Time Shared Option (TSO) for support of engineering and programming users, and on-line/batch IMS data base inquiry/update capabilities to the Orlando users on a 370/168 operating under MVT/Hasp. The Denver data center was offering the equivalent functions to the Denver area customers on a 370/158-370/145 configuration.

Denver Center Weakened

The first phase of this Shared Resources Processing (SRP) project was successfully implemented in April 1975. All non-IMS related batch Denver business scheduled and checkout batch work and TSO had been moved to processing in Orlando. The configuration in Denver had been reduced to a 370/155 with a minimum peripheral configuration to support on-line IMS/associated IMS related batch and some engineering users.

The net annual cost savings to the company and hence, customers, was approximately $500,000. This was largely due to the use of the proper telecommunications circuit configuration, the higher internal speed of the 370/168 and an appropriate work initiation scheme. The schedules for processing of the Denver business load (including financial, manufacturing, engineering, operations, etc.) received little or no adjustment compared with the previous Denver processing schedules.

The second phase of the SRP project was successfully accomplished in October 1975 and resulted in all batch/-TSO/IMS functions for both Denver and Orlando customers being processed in the Orlando 168 host center. This added an additional cost savings of $500,000.

Difficulties Experienced

On occasion, difficulties were experienced with the communications circuits due to random error conditions utilized for IMS and TSO between Denver and Orlando. These line difficulties were brought under control by implementing the Denver to Orlando portion of the current MMDS communications network utilizing Comten 3670/3650 communications processors.

At the time of initial implementation of Phase II of the SRP project, it was necessary to provide 11 9,600 bit/sec dedicated circuits between Denver and Orlando to service the Denver area batch/IMS/TSO users. Many 4,800 bit/sec channels were multiplexed over these circuits to provide IMS/TSO users with the same line speed configuration as existed before the consolidation.

A 50K bit/sec circuit between Orlando and Denver was also utilized at night for batch traffic between Orlando and Denver. When the Denver to Orlando communication network became operational, the number of 9,600 bit/sec circuits were reduced from 11 to five, and the subsequent use of the 50 bit/sec circuit was eliminated.

Consolidation Projects

Subsequent consolidation projects involving merging of customer workloads into fewer but larger host centers to accomplish additional cost savings have involved the placement of Comten remote communications processors in the appropriate geographical region. This allows interfacing with customer terminals in the area where host processing previously was accomplished.

The ease of interfacing customer terminals to one of the existing Comten nodes allows rapid implementation of a customer's terminal into the MMDS network with appropriate access to the host processing center. The structure of the Comten network allows the multiplexing of traffic from several customer's terminals between the Comten remote concentrator and host center, thereby providing significant economies in circuit costs.

For example, it is possible to interface a dozen terminals with a Comten in the Baltimore area and only utilize five 9,600 bit/sec circuits between Baltimore and Orlando. This presents significant savings in line/modem costs.

The cost savings benefits of consolidated processing are expected to be enhanced and further extended with the advent of the 3033 size of processors in a combined host center. With the near doubling of CPU capacity, for

(Continued on Page 48)

an on-line system
essly "me, too."
the price.)

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BASF The Original.

Computer Tapes Disk Packs Flexydisks Word Processing Supplies

College Gains Unexpected Bonus With COM

(Continued from Page 41)

appropriate indexing information is stored on microfiche.

While documents representing years of records had been filmed in "file drawer" sequence on 16mm cartridges in the past, that did not mean all documents pertaining to a specific student were in one place. The key role the 9600 CPU plays is the indexing of the hundreds of microfilm cartridges to assemble all relevant references to each student. The student index is arranged alphabetically on nearly 100 sheets of 105mm microfiche.

Now, when an administrator needs documents for a particular student, the operator reads the microfiche to find the numbers of cartridges and frames that contain the documents. LBCC uses 3M Co. Page Search microfilm reader/printers to call up the frames. If copies are needed, the reader/printer produces them on dry-silver paper.

The clerical time saved in the file searches alone would underwrite the entire cost of file conversion and microfilm within two or three years, according to Maas. He anticipates freeing two people, who have been handling transcript and other file searches, for other necessary work in general education classification.

It would cost more than $20,000 a year to hire and train new people for this work, he said.

The hidden benefit of the conversion came the day after the last records were removed from the boiler room. A pipe burst and flooded the area. The dousing would have caused untold damage to the records if they had still been stored there.

A price tag couldn't be put on the records that would have been lost, Maas said. The same standard applies to the improvement in service the school is able to give to the public, he added.

System Expedites Orders

(Continued from Page 44)

products on order and shipped to adjust production to meet market demand for the following month, the spokesman said.

Emery's order entry and billing system is now being operated only in conjunction with the company's Cincinnati plant, he noted. The second phase of the system calls for providing centralized order processing and billing. This will affect about half a dozen sales offices and public warehouses throughout the country. A planned third phase will see expansion of the centralized system to include other manufacturing locations, he said.

The system also has the capability to eventually be used for sales forecasting, production scheduling, inventory control, raw material purchasing and, ultimately, profit optimization through calculation of what products shold be sold, the spokesman said.

As a successful pioneering effort in on-line versus batch processing operations at Emery, the order entry and billing system will be used as the basis for on-line operations in other areas and divisions of the company. A full range of other accounting and management information systems are also handled in Emery's DP department, the spokesman explained.

Consolidation Brings Savings

(Continued from Page 45)

approximately the same cost as a 168-1, significant cost reductions should be realized as the 60% to 70% capacity level in a dual 3033 center is reached. This, in effect, gives an improved price/performance for such an installation.

In summary, the benefits of utilizing remote job processing services on a consolidated host center to a firm that has an underutilized computer, or has a full installation and needs additional processing power, can be very substantial in areas such as:

- Reduction of capital investment/-outlay.
- Reduction in monthly operating cost.
- Ability to get more functions (i.e., TSO, IMS).
- Improved programmer productivity through use of TSO.
- Speed of computatation.
- Help in tying together geographically dispersed divisions of a firm with common access to files (both scheduled work and checkout work).
- Ability to utilize the data base system of the host without extensive investment of internal equipment/staff.

Tieszen is operations/technology manager responsible for computer processing services long range planning at Martin Marietta Data Systems.

GILE IS HERE

Agile A1 Sighting Reported

[illegible] through ill streets

Excitement swept the populace recently as word of the first sighting of the Agile A1 daisy-wheel terminal was flashed throughout the metropolis. The A1, reported to be the first in a long line of microprocessor-based terminals to be offered by Agile, arrived from the firm's large new manufacturing facilities in Sunnyvale, California. A large production run for inventory was said to account for the immediate delivery of the terminal.

Early dispatches reported that every A1 terminal undergoes long burn-in at high temperature to assure purchasers of reliability. Inspection of the unit by your trustworthy reporter (which was hampered by the capering multitudes) disclosed that the A1 features a [illegible]-style keyboard with illuminated function lights.

[illegible] that the huzzahs of the [illegible] caused a horse to bolt on [illegible] were found not to be

[illegible]ably Clever Plot Revealed

[illegible] speed data plot- [illegible] business has [illegible] with the un- [illegible] Support

Correspondent reports

26 Agile Service Centers Announced

A network of 26 service centers has been established throughout the Nation to provide care for Agile and GenCom terminals, according to late reports. All centers stock parts for both kinds of terminals, including the **GenCom 300A, 300D,** and **300Q** machines. Centers in the major metropolises are staffed by Agile personnel, while the outlying Territories are served by carefully selected independent companies that are experienced in dealing with the Natives.

In an interview with Mr. R. Bullene, who identified himself as Agile's national service director, your correspondent elicited the following: "It's one thing to have an agreement for national service. It's quite another to have the necessary support in place. We're ready to provide service almost anywhere in the country."

Mr. Bullene solicited direct inquiries via the new electric telephone system at (408) 735-9904.

Variety of lease plans available for Agile A1

Attractive one-year operating leases

Longer-term, high equity plans also offered

(Story on page 6, col. 3)

Exclusive!

Agile Optional Features Revealed

This chronicle [illegible] compendium of the [illegible] tures available [illegible] terminal:

◇ Justification mode, which [illegible] the terminal to [illegible] justified text. [illegible] 1/120-inch inter-word [illegible] character spacing result [illegible] put of nearly photo-compos[illegible] quality.

◇ A transparency feature allows the printing of all 128 ASCII characters to make debugging and error locating easy.

◇ Data compression allows the user to drive a 55-cps mechanism with a 300-baud line.

◇ The print enhancement option features automatic overstrike and underscore to produce bold, enhanced printing at high speeds.

◇ Hardware options include special keyboard configurations, 45- and 55-cps mechanisms, and custom microcode features.

Details of Agile's options are too voluminous for this brief treatise, but may be had through contact with the manufacturer.

Immediate Delivery!!!

Agile promises shipment on receipt of order.

(Story on page 2, col. 4)

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City
State Zip
Telephone

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California 94086
(408) 73[illegible]

Agile A1 will appear at the Interface West Show November 1, 2 and 3.

Mini Bits

IBM Users Group To Hold Seminar

YORK, Pa. — The Central Pennsylvania System/3 Users Group is holding a seminar and exposition Nov. 1-2 in Hershey, Pa., according to a spokesman for the group.

For information, contact Terry C. Prowell, Central Pennsylvania System/3 Users Group, P.O. Box 361, York, Pa. 17405.

Interface West Set for L.A.

LOS ANGELES — Interface West, to be held here Nov. 1-3, will focus on data processing options for small businesses, according to a conference spokeswoman.

The conference will focus on in-house computing, sharing time with other companies and using service bureaus. Exhibits on applications software, small systems, mini/micro peripherals and word processing systems will also be offered.

Registration for the conference is $75. Information is available from 160 Speen St., Framingham, Mass. 01701.

Lessor Offers DEC Units on Rent

PHOENIX — Manufacturers' Lease Plans, Inc. (MLP), a leasing firm, has a rental plan for Digital Equipment Corp. users.

The rental plan covers the high end of the DEC Datasystem 350 series and most of the DEC Datasystem 500 products, MLP said. One, two- and three-year terms are available.

MLP must add some value to the system in order to provide the rental plan, a spokesman explained, but this value may be in the form of training or something similar.

A DEC Datasystem 357A with 128K bytes of MOS memory, programmer's console, Decwriter II console, 14M-byte RK06 disk drive and controller, memory management bootstrap loader and CTS 500 software costs $1,899/mo on the one-year plan, $1,740/mo on the two-year agreement and $1,530/mo on the three-year plan, not including maintenance.

That system would cost $52,750 from DEC, the spokesman said.

MLP can be reached at 3443 N. Central Ave., Phoenix, Ariz. 85012.

Correction

The name of the system from Micro Business Applications, Inc. [CW, Sept. 19, p. 59] is the Micron-740. The system was designed for industrial manufacturers and wholesale distributors. The company can be reached through P.O. Box 2888, La Jolla, Calif. 92038.

For Dispersed DP

Datapoint Has 32K Mini

SAN ANTONIO, Texas — The 1500 dispersed processing system introduced recently by Datapoint Corp. is a 32K minicomputer with a CRT and 500K bytes of diskette storage, programmable in the firm's Databus business programming language, with a price tag of $5,950.

The system runs under a diskette operating system that allows two operations such as data processing and print spooling to take place concurrently. The CPU and memory for the system are contained on a single printed circuit board, Datapoint noted.

Designed for use in both stand-alone and distributed data entry applications, the 1500 contains integral communications interface facilities to support emulation of the IBM 3780. Using the 3780 protocol, the system can communicate at speeds up to 4,800 bit/sec with either an IBM mainframe, 3780 terminal or other Datapoint processor running in the same emulation mode, the company explained.

The system can also communicate with a central Datapoint processor under the company's Datapoll communications package. In this mode, the 1500 would act as a slave processor.

The keyboard for the system has a basic 55-key alphanumeric group, 10-key numeric pad and five programmable function keys. The CRT accommodates 24 lines by 80 characters and features a green-on-

(Continued on Page 52)

Qantel Unveils Business CPU

HAYWARD, Calif. — Qantel Corp. has unveiled a business system designed to serve as a stand-alone system for entry-level users or as a host or satellite processor in a distributed processing network.

Called the Model 210, the system includes a CPU with 16K bytes of user-accessable memory, floppy disk drive and CRT. Built-in expansion space for additional communications, increased memory and storage capacity as well as I/O devices are available.

The 210 is compatible with all of Qantel's larger systems at program development, system software and application software levels, the firm said.

The CRT console features horizontal and vertical rotation and a separate keyboard with alpha and numeric pads. This is connected to the CPU with a 4-ft cable. The entire system weighs 60 pounds.

Expanded, the system can accommodate more memory, any of three hard-copy printers and synchronous and asynchronous communications.

Each I/O controller for the system includes a microprocessor and two memories. This design is said to enhance overall computing efficiency by enabling the CPU to perform multiple jobs simultaneously.

The floppy drives for the system use single-sided media with double-track density and use a servo-controlled linear actuator.

With the addition of asynchronous communications facilities, the system can transmit data to other 210s or Qantel's 950 and 1400 systems. The systems can also communicate with other manufacturer's equipment, the company added.

A system with 48K bytes of memory, integral CRT, 1.3M bytes of disk storage, and including a foreground/background operating system costs $11,950. Qantel can be reached at 3523 Breakwater Ave., Hayward, Calif. 94545.

Small System Supplies Savings

By Esther Surden
CW Staff

WARREN, Mich. — A small business system running a specialized applications package is supplying savings to Wholesalers Supply Co. here.

"We came into the whole thing through the back door," DP manager John Hegener explained. "What we were really looking for was software that was compatible with our particular operation." Thus, the firm's initial search for a small system covered software packages that suited automotive wholesaling.

The company which performs DP for several related firms, looked at all the standard packages offered by Honeywell Information Systems, Burroughs Corp. and IBM. It narrowed the field to either a package that Burroughs had to run on its equipment and one from Computer Resources that ran on a small Honeywell system of America, Inc. (CRA) "We basically decided on CRA because it was readily adaptable to an automotive warehouse situation," Hegener said.

The distribution management application at Wholesalers covers order entry, billing, inventory control, purchasing and receiving. When a customer calls into the company with an order, that order is keyed into the system via CRTs and a packing slip is

(Continued on Page 52)

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Interdata Minis Get Tape Control Board

ANAHEIM, Calif. — A single-board magnetic tape controller for Interdata, Inc. minicomputers is available from Western Peripherals, Inc.

The TC-140 features software compatibility with existing Interdata operating systems, the firm claimed.

The plug-in board is a dual-density controller with interface and formatting electronics for both phase encoding (PE) and NRZ.

It is said to be compatible with the current Interdata family of computers, as well as with some of the earlier series. Fully embedded, the controller requires no separate chassis or power supply and operates via the selector channel or multiplexer bus, the vendor said.

Up to four drives can be handled by the unit in any combination of 7-track NRZ, 9-track NRZ; 9-rack PE or 9-track PE/NRZ, at any two speeds in the range of 12.5 in./sec to 125 in./sec.

The controller also features an extended command register and an enhanced status register, the company noted.

The controller costs $3,100 from Western Peripherals, Inc., 1100 Claudina Place, Anaheim, Calif. 92805.

Turnkey Based on Series/1

WESTPORT, Conn. — Compudata Systems, Inc. has a turnkey system, based on the IBM Series/1 minicomputer, designed for first-time users or for multiple system users in distributed processing networks.

The system includes IBM's real-time operating system. The programming language for the system is Compudata's implementation Cobol, the company noted.

Basic hardware includes a 64K-byte processor, 9.3M bytes of fixed disk, a 500 K-byte diskette, a 120-char./sec printer and a 1,920-char. CRT. The system can accommodate additional disk drives, multiple CRTs, faster line printers and data communications, the vendor said.

Standard features include CRT input and inquiry, multiple job processing, simultaneous operation by multiple operators, menu job selection and on-demand printing, Compudata said.

The basic Series/1 with application programs for general accounting and on-premise training by Compudata costs $41,000. IBM will maintain the system through its nearest service center, Compudata said from 772 E. State Street, Westport, Conn. 06880.

Printer Outputs 120 Char./Sec

HUDSON, N.H. — Centronics Data Computer Corp. has expanded its 700 Series of serial dot matrix printers with the introduction of a 120 char./sec Model 702. This printer is designed for use in distributed processing and small business applications, the company noted.

A 132-column, bidirectional impact printer, the 702 features a standard 7 by 7 dot matrix pattern. Other patterns optionally available include 5 by 7, 9 by 7, 7 by 9 and 9 by 9, the firm added. Ten characters are accommodated in each horizontal inch.

The printer will be available during the fourth quarter and costs $2,145 from Centronics in Hudson, N.H. 03051.

Controller Fits DG, DEC Minis

LAFAYETE, Calif. — Zeta Research has a microprocessor interface graphics controller that plugs into the backplane of a Data General Corp. Nova or Eclipse or a Digital Equipment Corp. PDP-11 mini.

The controller costs $2,500 from the firm at 1043 Stuart St., Lafayette, Calif. 94549.

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The HP 2631A printer and HP 2635A printing terminal with alphanumeric keyboard are the first members of a new Hewlett-Packard family of hard copy terminals.

Each machine was designed to give you a number of high-performance features. And both can support a variety of interfaces, including RS232 and CCITT.V24, to fit into systems made by HP and other manufacturers.

Bi-directional printing increases throughput. Both printers zip along at 180 cps in both directions, depending on your line layout. The microprocessor chooses the quickest path, and increases the speed even more by suppressing leading and trailing blanks.

High-speed slew for columnar data. When the microprocessor senses more than ten blanks in a row, it slews the print head at 45 inches per second to the next print position.

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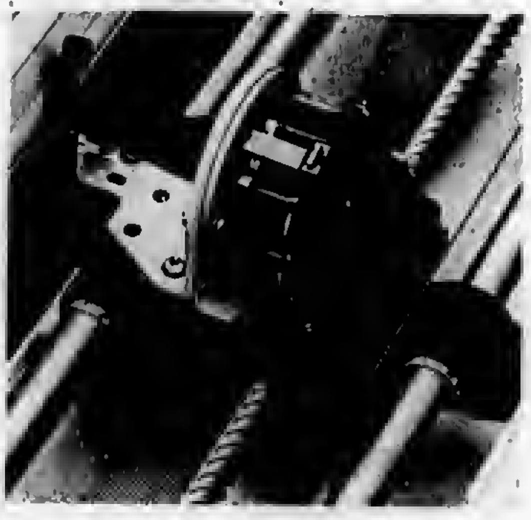
Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow true underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.

Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a stand-alone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

46701HPB2

PDP-11/70 Gets Add-On

ENGLEWOOD, Colo. — Monolithic Systems Corp. has introduced an add-on memory for the Digital Equipment Corp. PDP-11/70 that provides up to 2M bytes in a self-contained unit.

Designated the MSC 3602, the memory is expandable in 64K-byte increments to 4M bytes with an additional 5.25-in. chassis, the firm said.

The MSC 3602's access time of 500 nsec and cycle time of 700 nsec permit use of the PDP-11/70's memory bus at the maximum data rate, Monolithic claimed.

Error correction control circuitry is employed to provide one-bit error correction and two-bit error detection. A maintenance panel provides visual monitoring.

The MSC 3602 costs $9,525 for 128K bytes. Monolithic is at 14 Inverness Drive East, Englewood, Colo. 80110.

Persci Has Disk Units for Minis

W. LOS ANGELES — A series of IBM-compatible mass storage systems for minicomputer applications has been introduced by Persci, Inc.

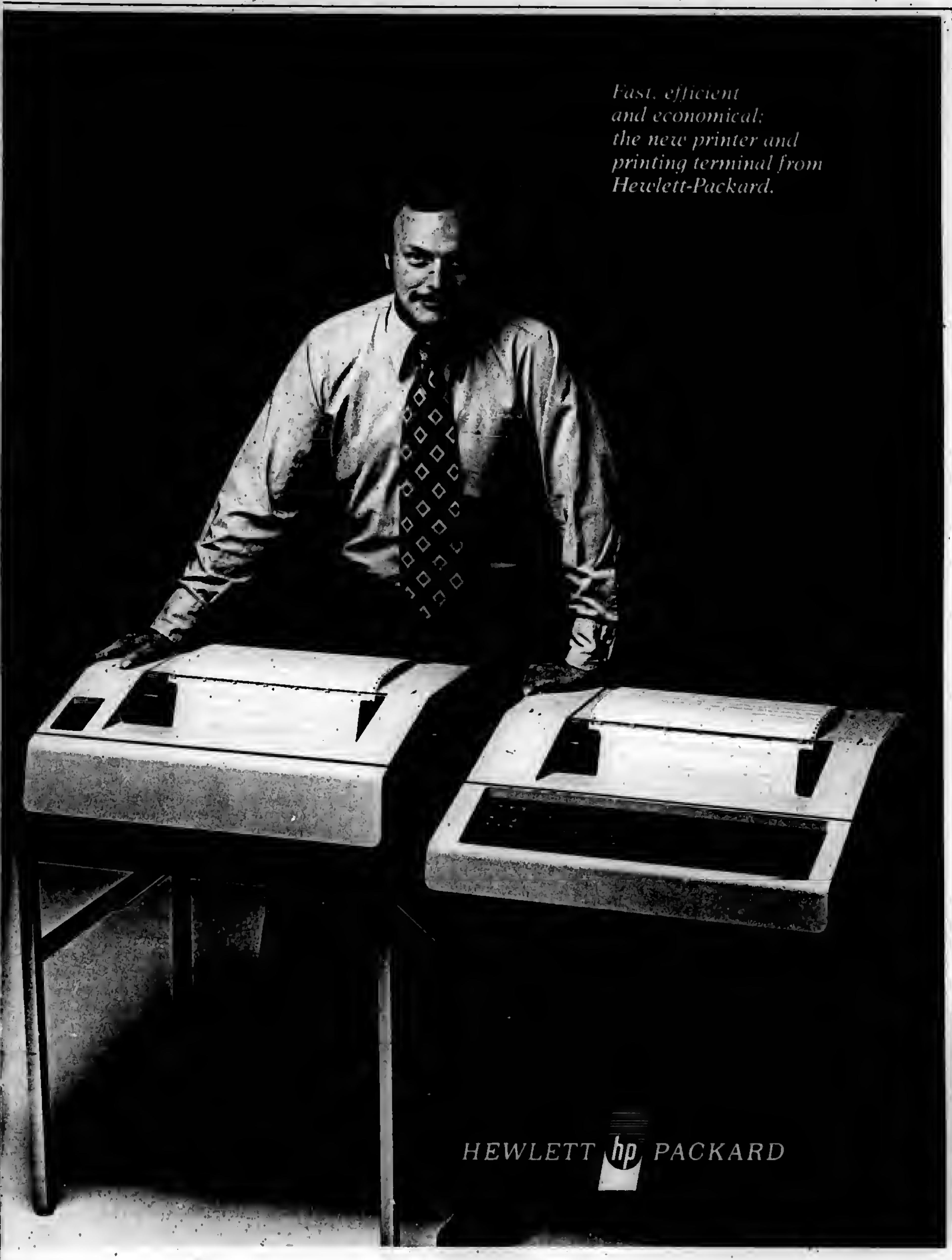
The systems, with data capacities to 1M byte formatted, incorporate a dual diskette drive and are available in a variety of configurations:

- A one- or two-drive (two- or four-spindle) system with microprocessor-based controller, power supply and cabling enclosed in a 19-in. rack-mountable chassis.
- A one- or two-drive system. with power supply and cabinet but without the controller.
- A "slimline" system measuring 4.5 in. wide when vertically mounted that incorporates one dual drive (two spindles) and a power supply in a table-top chassis.

The controller, which can be incorporated in the two-drive configuration, is also available separately for mounting in the host, the firm said. It includes an 8080-type microprocessor and has an internal disk operating system in firmware.

A two-drive system with controller costs $3,995; a one-drive system with controller is priced at $2,895; the two-drive system without controller costs $2,760; a one-drive system without controller is $1,630; the single-drive "slimline" system costs $2,110; and the controller alone is priced at $740.

Persci is at 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.



HP System 45 Expands to 64K For Non-DP Uses

PALO ALTO, Calif. — Designed for scientific, materials management and other non-DP uses, the 9800 System 45 from Hewlett-Packard Co. is a desktop system programmable in Basic.

The System 45 includes 16K bytes of memory expandable to 64K bytes; about 13K bytes of this is not user-accessible, HP noted.

Incorporated in the system is a CRT that provides both graphics and alphanumeric displays. In the graphics mode, the system includes a 560 by 455 dot matrix "with no perceptible flicker," the company claimed.

Split Screen

In alphanumeric mode, the screen is split, offering an 80-character wide, 24-line deep display.

The top 20 lines are dedicated to output in the form of user data, program listings, etc., while the bottom four are used for prompting and diagnostic signals, the firm said.

The keyboard for the system has separate groupings of keys for program control and editing, CRT control and 32 user-definable functions.

A 210K-byte tape cartridge system is standard with the system.

The 75-lb system costs about $12,000 for 16K bytes of memory, CRT and keyboard and one tape transport, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Mini Seen Helping Thrift Institutions Compete

BOSTON — Minicomputers are gaining wide acceptance by small thrift institutions, according to John M. Thompson, vice-president of Index Systems, Inc.

Speaking at the National Association of Mutual Savings Banks Conference on Minicomputers here recently, Thompson told the group that the reason minis are finding their way into the thrift business is threefold.

First, because of increased competition for consumer deposits from commercial banks and credit unions, thrift institutions have had to "adopt a more aggressive marketing posture," he stated.

"Never before has it been so important to be able to cross sell to your existing customer base. A comprehensive customer information file with the ability to target customers by tapes is the required system to support an effective cross selling program," he noted.

Second, increased regulatory activity has led to new services such as NOW and checking accounts. Institutions must track the profitability of each of these products and services by responsibility and cost center to evaluate profit effectiveness.

A third reason is "new technology has made it possible for other financial institutions to enter your marketplace where they have never competed before," he pointed out.

The threats have led to three different systems which suit the three different situations, Thompson stated.

Most of the thrifts venture into in-house DP through a financial control system that automates the back office, thus producing management reports by responsibility center that show variances against budget.

This "first building block to provide financial control and to measure where you are making and losing money" usually includes general ledger, budget and responsibility accounting, securities accounting, portfolio management and fixed-asset accounting applications, he noted.

Users can then expand that mini with more disk, memory and terminals to provide a customer information file for marketing support, Thompson continued. In this application, the mini can be used in conjunction with a service bureau to provide the marketing details needed.

The mini is updated nightly with a tape from the service bureau that includes information on new accounts and new balances. The small system "provides you with CRT displays to access all of the account relationships of any household."

The third step using minis brings the entire transaction processing application in-house, replacing the on-line service bureau.

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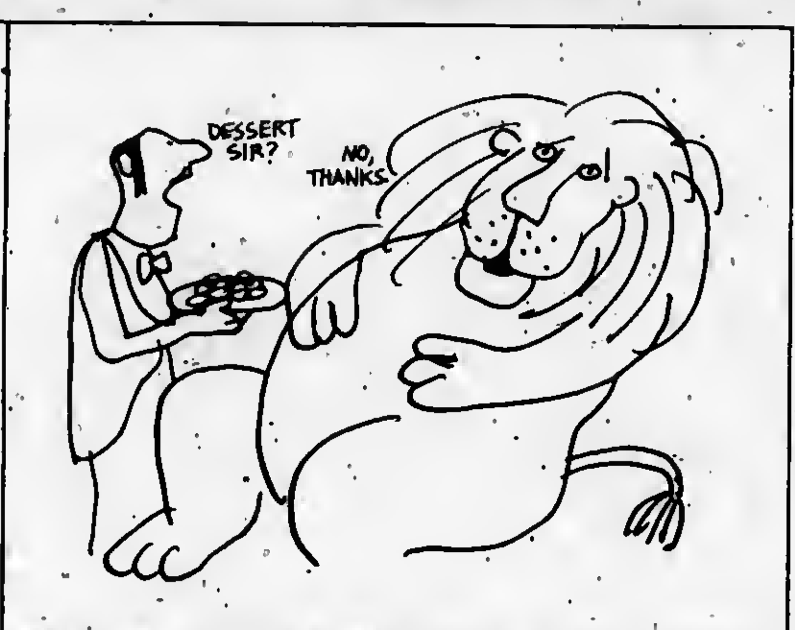
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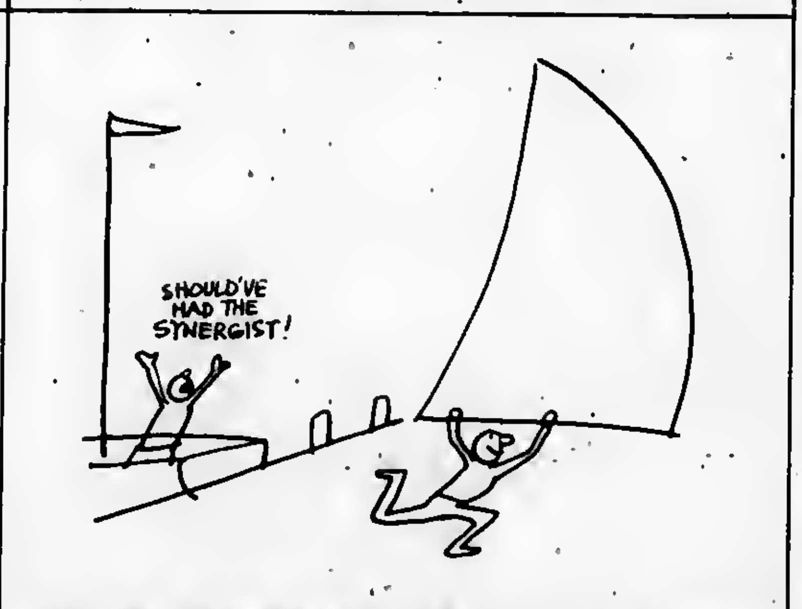
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System Handles Dispersed DP

(Continued from Page 49)

black screen. An inverse video feature can be programmed to highlight special fields, the firm noted.

The diskette drive uses IBM-compatible media and includes a "drive in use" warning light to alert the operator when a diskette is currently being accessed by the processor.

The system is programmable in both the Databus language and Dataform, a data entry language.

The 1500 "will fit into practically any office environment," Datapoint noted, but a dusty or particle-laden atmosphere must be avoided as the contaminants could cause floppy disk media damage. Information is available from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

Small System Brings Savings

(Continued from Page 49)

generated. From the packing slip the order is pulled and is shipped to the customer. An invoice is then generated.

Inventory for all items is kept on the system. Inventory is updated daily and the inventory module interfaces with purchasing and receiving operations. An inquiry system allows the firm to answer questions from all of the major files, Hegener added.

The small Honeywell system also performs payroll, payables and general ledger applications for several companies owned by the holding company that owns Wholesalers Supply.

Hardware for the system includes a Honeywell 62/60 with 256K of memory, four disk drives, one 800 line/min printer, one read-only printer and seven CRTs. The CRTs are scattered throughout the billing, purchasing and order desk areas.

Hegener credits the small system and its software with a number of savings.

"When we worked with the service bureau, the billing and updating of customer accounts was continually a week to a week and a half behind."

"Now we are able to get statements to customers prior to the first of the month; therefore, we have increased our cash flow with the bulk of our cash now received a week to a week and a half earlier than before," he said.

Another improvement credited to the system is better turnaround on the inventory. Because inventory files get updated faster, management has more current information, he noted.

A multiple choice quiz on Keybatch.

A multifunction data entry system from Data 100.

(WARNING: there may be more than one right answer to each question)

---

1. Keybatch is:

(a) a multifunction intelligent key-to-disk data entry system.

(b) a brand new multifunction system from Data 100.

(c) a multifunction system which supports high volume concurrent batch capabilities.

2. Keybatch is also:

(a) a multifunction system offering stand-alone RPG for expanded user flexibility.

(b) a multifunction system that can operate with on-line file inquiry capabilities (3271 compatible) via common keystations for both data entry and on-line file inquiry.

(c) a system capable of handling mail sorting and other office tasks.

3. As a data entry system:

(a) Keybatch has up to 20 megabyte disk storage capacity.

(b) Keybatch is proven with approximately 900 units now in use.

(c) Keybatch can be configured with 2 to 16 keystations.

4. For the end user:

(a) Keybatch meets short range goals such as appreciable dollar savings.

(b) Keybatch provides for long range system growth.

(c) Keybatch offers both of the above.

5. For more information on Keybatch, you should:

(a) search frantically through your EDP literature files.

(b) write Data 100 at 6110 Blue Circle Drive, Minnetonka, MN 55343.

(c) call your nearest Data 100 sales office or one of the numbers we've listed.

Are you a multifunction expert? Check these correct answers.

All answers but four are correct.

1b: Keybatch isn't brand new, was introduced in 1974.

2c: Sorry, Keybatch can't do everything.

3b: There are actually 1500 Keybatch systems on the job worldwide.

5a: No need to search when we're so easy to write or phone. Do it now.

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Strategies — Part 2

Sites Need Thorough Check Before Optimizing

Special to CW

In order to optimize job mix, processing throughput and user response time during each shift, the DP manager should look closely at on-line systems, time-sharing and remote terminal use.

On-line or time-sharing systems applications must be reviewed to establish their environmental characteristics; that is, the input/output nature of these applications should permit small program sizes that are dynamically called.

The use of remote terminal minicomputer systems by programmers has helped to decrease total systems development time and increase productivity. However, like the production environment, if loose discipline and minimal supervision exist, then abuse will follow and development efforts will adversely affect the minicomputer production environment, both time-sharing and batch processing.

The concept of remote terminal program development instead of batch card program testing with program listings should be rigidly enforced during prime shift. This standard will greatly increase minicomputer program testing capacity, without detracting from the overall productivity of batch processing.

What is system overhead? What is good, bad, excellent, unsatisfactory, etc. percentage of total workload assigned to system overhead? These questions are difficult to answer. Does it include all rerun time or only the portion attributable to system error?

This is the final half of a two-part series on objective methods to measure and evaluate current and planned minicomputer operations and systems development activities. The article was prepared by the marketing department of Data General Corp.

Does it include preventive maintenance time? How is it measured — percentage of CPU cycles, core, external storage, etc.? You can, of course, hire a hardware/software monitoring company to define it.

While such classifications of current workload are helpful in gathering necessary data and evaluating current demands, the overall throughput of the system must be the most important consideration, that is, measurement of "responses" and reports generated each day.

The key to planning future workloads lies with the user departments. They can identify their needs for new systems on the expansion of current systems over the next several years. A priority list of required systems to be developed and information reporting or inquiry requirements should be created with the user departments.

Capacity of a system is determined by three characteristics which limit computer process time: space, occupancy time and user time in a system's resource. There must be enough space in a minicomputer site's resources to accommodate the workload.

If space in memory and auxiliary storage is available, it must be available for enough time to satisfy processing requirements. If enough occupancy time is available, enough use time in resources must be available to allow satisfactory processing of workload. Whichever of these factors "runs out" first sets the system capacity at the level of processing which caused that shortage.

Manipulating Capacity

Capacity can be manipulated by making changes in the job stream, making changes in the hardware, altering the amount of capacity "spent" on overhead or changing installed hardware or staffing levels at the minicomputer site.

Interviews with user departments and direct observation of terminal response times for on-line or time-sharing systems should be conducted to determine system response times. Batch data input workload arrival times (from user departments) at the minicomputer site should be logged daily.

The average batch input arrival time should be calculated for the current month and entered on a "timeliness" form. Integrating on-line system response times and batch input arrival times with processing time yields a good picture of the user departments' time requirements for minicomputer processing.

Overall performance measures are used to describe the processing characteristics of the minicomputer site as the user seem them. These are expressed in terms of data input workload, terminal data entry-data base inquiry and update, and report processing output.

Since people are part of the resources in a DP site, further measures are obtained through use of time records, manual data logging, manual systems and data input job function, systems and workflow analysis.

Collection and reporting of overall performance measures may require implementation of special logging procedures. As system resources are altered both the overall and system performance measures change.

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If you're unable to attend the ACM conference, to apply for a position please send your resume, including salary history, in confidence to Jim Stewart, Data General Corp., 15 Turnpike Rd., Westboro, MA 01581.

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Programmable Calculators: Two Views

• Offer Many Challenges

By Frank Vaughan
CW Staff

SAN FRANCISCO — "For the hobbyist, the new [programmable] calculators offer new challenges in tricky and elegant programming techniques. and perhaps the joy of discovering features and uses of the calculator that were never intended by the manufacturer," a paper presented here recently said.

The paper was presented by Rex H. Shudde of the Naval Postgraduate School, at the 1977 Western Electronic Show and Convention (Wescon).

From an advanced user's point of view, two of the most important features in personal programmable calculators are the number of program steps and the number of available storage registers, Shudde stated.

Number of Steps

"The number of program steps is important, for with more steps it is possible to create programs of ever increasing complexity and capability.

"The number of storage registers is important, for with more registers the ability to handle larger amounts of data is increased. An example is the solution of simultaneous linear equations; a system of n equations in n unknowns requires the use of $n(n + 1)$ storage locations for just the coefficients and constants, and additional 'scratch' storage is required for intermediate computations," he noted.

Broad Spectrum

There is a broad spectrum of possible user applications and requirements which can be satisfied by the latest models of programmable calculators, he said. With many applications problems the user does not need to know how to program the calculator, what is needed is a collection or library of programs that can be used to perform the required computations, he noted.

"For the scientists and engineers who perform varied computations in their research and work, the latest generation of calculators offer increased computational capability.

"This increased capability can mean increased convenience, decreased reliance on a centralized computer system and faster turnaround time in obtaining solutions to complex problems," he concluded.

• User Groups Needed

By Frank Vaughan
CW Staff

SAN FRANCISCO — There is a real need for personal programmable calculator (PPC) user organizations to act as a communications focal points for PPC users to share applications, according to a presentation made here recently.

The presentation, "Calculator Users of the World Unite to Develop Advanced Applications" was made at the 1977 Western Electronic Show and Convention (Wescon) here by Richard J. Nelson, an applications engineer with Statek Corp.

Because of limited publicity, the clubs have grown with the general PPC population to remain with membership of about 1% of total PPC users. The real reason why the clubs don't grow proportionately larger is unknown, he said.

One reason may be that the PPC clubs are composed of talented and advanced users and the average user is overawed at the seemingly complex nature of advanced applications, Nelson indicated.

The greatest reason for the lack of growth is the lack of publicity concerning the clubs. One of the most important things that a manufacturer can do for its user organization is to include the information of the existence of the user groups with each machine they sell, he added.

The era of personal computing started in January 1974 when the first PPC, the Hewlett-Packard Co. HP-65 with external memory was introduced.

"Computer or calculator, users of the HP-65 soon found it had more power and capability than even Hewlett-Packard had imagined. Six months later, June 1974, enough machines had been in the hands of users that had become so skilled in their use of the machine, that Hewlett-Packard was not able to answer their technical inquiries.

Out of the Frustration

"Out of the frustration of not having a ready source of information on the HP-65, the HP-65 Users Club was formed. From this seed grew numerous groups and ultimately a Council of Personal Programmable Calculator Users Organizations.

"The systematic publication of machine anomalies, programming techniques and applications quickly advanced the PPC state-of-the-art. The enthusiasts that joined these groups developed and published applications and techiques that became well known and published nine to 12 months later in the conventional technical literature.

The applications these advanced users developed made their machines perform unconventionally and when the uninformed user asked the manufacturer about these applications, he was often told that 'it can't be done,'" Nelson explained.

Today, Nelson contends, the situation is different; all manufacturers of PPCs recognize the accomplishments of these advanced users and even recommend that their customers consult them when the manufacturers receive questions that they cannot expend the time, manpower or resources to answer.

Examples of the accomplishments of PPC user groups that Nelson discussed included a correction card that allows HP-67/97 program cards which have been write-protected to be rewritten on; keyboard overlays that permit the input or output of alphabetic information; use of non-normalized-numbers; display words and graphics and black boxes.

"The PPC presents a challenge to its user. Because it is so powerful it serves its owner as more than just a problem solver. Advanced applications developed by PPC users organized to share programming techniques, software and applications help the PPC club member make maximum use of hardware," Nelson concluded.

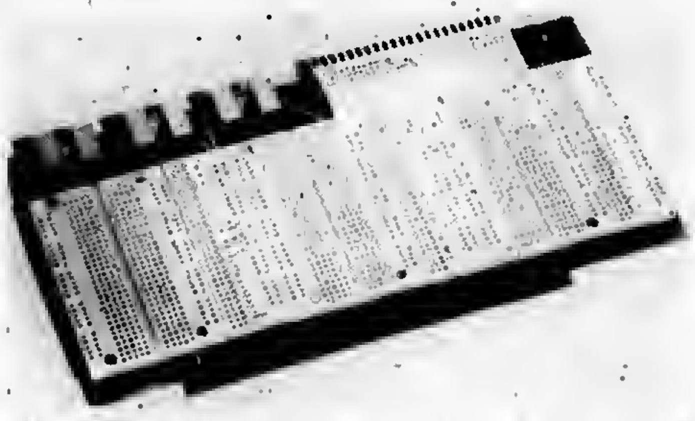
S-100 Breadboard Card Offered

DERBY, Conn. — E&L Instruments, Inc. here has introduced a universal breadboarding card for interfacing S-100 Bus microcomputers with peripheral devices or experimental circuitry.

Lines on the S-100 card are divided into address, data and control sections, and the user has access to every signal generated by the microcomputer, a spokesman said. Each card is equipped with three voltage regulators, +5V +12V, and -12V as well as with points for obtaining unregulated voltage.

The card is 5 in. by 10 in. and has 50 double-sided gold plated contacts on one edge for interconnecting with the microcomputer and 22 contact on the opposite edge for interfacing and breadboarding.

The S-100 card costs $75 and is available from E&L at 61 First St., Derby, Conn. 06418.



The E&L breadboard card interfaces S-100 bus systems with peripherals or test circuits, features three voltage regulators and boasts gold-plated contacts, the firm noted.

'Best of' Hobby Reading Published

MORRISTOWN, N.J. — Hobbyists interested in some varied reading on different aspects of their hobby might be interested in four different publications from the Creative Computing Library.

The Best of Creative Computing, volumes 1 and 2 combine to bring the best of the articles, fiction, foolishness, puzzles, programs, games and reviews from the first two years of *Creative Computing* magazine, according to a spokesman.

The Best of Byte, volume 1, contains the majority of the material in the first 12 issues of *Byte* magazine. A large portion is devoted to hardware, software and applications, and some attention is given to theory and where the computer hobby is heading, the spokesman said.

Jokes and Gibes

The Colossal Computer Cartoon Book contains 15 chapters of jokes, gibes and cartoons about the world of computers, he added.

The Creative Computing volumes sell for $8.95 each, the Byte volume goes for $12.95 and the cartoon book sells for $5.95 from Creative Computing at P.O. Box 789-M, Morristown, N.J. 07960.

Upgrade Kit Converts Poly 88

SANTA BARBARA, Calif. — Polymorphic Systems, Inc. has introduced an upgrade kit for users of its Poly 88 microcomputer system. The kit will convert the Poly 88 into a System 8813 diskette-based system.

The kit contains all mechanical parts and electronic assemblies necessary for the upgrade, the firm said. The kit includes chassis, cabinet, 10-slot backplane, power supply, floppy disk controller, 2K bytes of read-only memory (ROM), a fan, one floppy disk controller and two system diskettes.

The conversion reportedly takes only a few hours to complete. The Poly 88 Disk Kit is priced at $1,450 and up to two additional disk drives can be added at a cost of $590 each. The firm is at 460 Ward Drive, Santa Barbara, Calif. 93111.

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WHOLESALE BRAND NAME PERIPHERALS Shugart 801 dual floppy's with power supply $1,280; ADDS Regent 100 CRT's with all options $1,395; Centronics 701 80cps printers with standard options $1,750; Teletype Model 40 300lpm printers $3,530; Call Small Business Data Systems, Inc. (303) 371-3150. Ask about our total system.

Hobby Havens

As a service to hobbyist readers, Computerworld *periodically will list the micro clubs in different parts of the country.*

Clubs wishing to be included in this listing should send their name and address or telephone number of a contact person to Frank Vaughan at Computerworld, *797 Washington St., Newton, Mass. 02160.*

CANADA

Niagara Area Computer Club. Contact: John Youngquist, Box 122, Fort Erie, Ontario, Canada.

Toronto Region Amateur Computer Enthusiasts. Contact: Harold G. Melanson, Streetsville Post Office, Missauga, Ontario, Canada.

ILLINOIS

Packard Personal Computing Club. Contact: Jack Stansbeary, c/o Packard Instrument Co., 2200 Warrensville Rd., Downers Grove, Ill. 60515.

Chicago Area Computer Hobbyist Exchange. Contact: Bill Precht, 1102 South Edison St., Lombard, Ill. 60148.

INDIANA

Louisville Area Computer Club. Contact: Andy Ehalt, 115 Edgemont Drive, New Albany, Ind. 47150.

Hoosier Amateur Computer & Kluge Society. Contact: Ray Borrill, 111 South College Avenue, Bloomington, Ind. 47401.

Valpo Tech Microcomputer Society. Contact: Arthur Hershman, Valpariso Technical Institute, Valpariso, Ind. 46383.

Calumet Computer Tribe. Contact: Ray Seiden, 6825 Ridgeland Ave., Hammond, Ind. 46324.

Indianapolis Small Systems Group. Contact: Mike Sanderson, 2201 West 79th St., Indianapolis, Ind. 46260.

Summit City Computer Club. Contact: Stuart Brown, 3534 South Barr, Ft. Wayne, Ind. 46806.

MICHIGAN

Southeastern Michigan Computer Organization. Contact: Jim Rarus, 15377 Veronica, East Detroit, Mich. 48021.

Lansing Microprocessor Club. Contact: Bill Serviss, 13121 Tucker Drive, DeWitt, Mich. 48820.

OHIO

Dayton Microcomputer Association. Contact: Dave Lundy, 1404 Long Island Court, Xenia, Ohio 45385.

Amateur Computer Society of Ohio. Contact: Fred Hatfield, 1372 Grandview Ave., Columbus, Ohio 43212.

Cleveland Digital Group. Contact: John Tucky, 4006 East 57th Street, Cleveland, Ohio 44105.

Cincinnati Computer Club. Contact: Mike Shebesta, 1838 Fireside Drive, Cincinnati, Ohio 45230.

Computer Hobbyists Around Toledo. Contact: Bill Gensbechler, 2227 Portsmouth Ave., Toledo, Ohio 43612.

WISCONSIN

Durant Computer Club. Contact: Jim White, 901 South 12th St., Watertown, Wis. 55094.

Wisconsin Amateur Computer Club. Contact: Don Stevens, Box 159, Sheboygen Falls, Wis. 53085.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Profits Masked: McAdams

IBM's Return Outdistances Industry's

By Catherine Arnst
CW Staff

NEW YORK — By adjusting figures in IBM's annual reports, a picture of a company with profits at a much higher level than the rest of the computer industry emerges, according to a government economist testifying in the U.S. vs. IBM antitrust trial.

For the year 1974, IBM's return on investment was 49.3%, according to charts developed by Dr. Alan K. McAdams, the Justice Department's chief economic advisor for this case.

Of the ten other firms analyzed with the same methods used for IBM (Burroughs, Control Data Corp., Digital Equipment Corp., General Electric, Honeywell, NCR, RCA, Xerox and Sperry Rand), the next highest were CDC and Xerox with 33.5% and 33.6% respectively. The other companies ranged from 14.5% to 25.7%.

McAdams drew up a series of charts depicting what he claims is IBM's unique position in the industry. All his figures were derived by what he termed a "simple process" which any financial analyst would do as part of normal business procedure to measure a firm's profitability.

The charts were designed to demonstrate three points the government is trying to make about IBM's alleged monopoly position — that it has a large cash hoard, a fast rate of depreciation when compared to the rest of the industry and only a small percentage of its financing comes from long term debt. These three factors combine to mask IBM's actual return on investment.

An unsophisticated way to measure a firm's profits is to divide the net earnings after taxes by stockholder's equity, he testified. By using this method, IBM shows a 17.9% return on investment in 1975, which, although higher than most of the other computer firms analyzed, is still within a close range. The other companies' percentages ranged from 4.9% for CDC that year to 17.9% for Xerox (Xerox's high profit level can be attributed to the large earnings it obtains in the copying machine market, McAdams said).

McAdams then calculated IBM's cash on hand and marketable securities. A corporation generally does not keep a large amount of these assets because they earn a very low interest rate and are taxed at approximately 48%, he said.

IBM, however, had a $4,768,314,000 in these assets in 1975, he calculated. The company maintains such a large cash hoard in order to finance new product developments, price cuts and leasing arrangements which were in turn often used to contain competition, he said.

In a companion chart, McAdams subtracted out after tax income derived from cash and marketable securities from the net earnings after taxes for all 11 firms in order to determine their earnings on operations only. With this adjustment, IBM's percentage rose to 25.9%, an eight point increase, The other firms remained virtually the same, with only a one point change up or down.

McAdams used another set of charts to illustrate his testimony concerning IBM's fast rate of depreciation used for equipment out on lease. While other firms in the computer industry attempted to make their profits appear higher by using a very slow rate of depreciation, IBM was trying to make its profits seem lower with the opposite technique, McAdams said.

He developed a chart of the 11 manufacturers' cash flow, which is the net earnings after taxes plus depreciation and amortization. The results showed that in 1975, IBM had a cash flow of 32.1%, Xerox had 47.4%, and the other firms ranged from 15.9% to 27.2%.

When income from cash and marketable securities is subtracted out of the net earnings after taxes, IBM's cash flow percentage jumps to 50.1%, while every other firm again stays around the same figure, usually dropping by only one or two points, he noted.

A set of charts was developed to show total capitalization (which is stockholder's equity plus long term debt) by dividing that figure into net earnings after taxes.

In the first chart, IBM goes up one-tenth of a point from the first chart McAdams used, where net earnings were divided by stockholders' equity only (from 17.3% to 17.4%). Most of the other firms used in the comparison dropped by some small amount, although CDC went up 2.8%.

When adjustments are made for the firms for all three items — cash reserves, depreciation and long term debt — McAdams derived the 49.3% figure to show IBM's return on investment in 1974. This is a 31.9% increase from the figure McAdams derived in the first chart he did, which contained no adjustments. The results for the other firms only rose between 4.3% and 19.2% for 1974, according to the charts.

Not only do these figures show high earnings which are the result of a monopoly position in the computer industry, they also show how IBM's accounting techniques attempt to mask that high profitability, McAdams said.

Adapso Pledges to Support Computer Crime Legislation

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) has indicated it is vigorously supporting the Federal Computer Systems Protection Act of 1977 [CW, July 4].

"We firmly believe that a law which strengthens the government's ability to prosecute computer-related crime, and which permits the imposition of meaningful penalties, is long overdue," Adapso Executive Vice-President Jerome L. Dreyer wrote to the bill's sponsor Sen. Abraham Ribicoff (D.-Conn.).

Under the bill, those who are found guilty of misusing computer systems of the federal government, certain financial institutions and other entities involved in interstate commerce could receive jail terms of up to 15 years and/or fines up to $50,000.

"Such a law would perhaps even more importantly go a long way toward fostering the public confidence in the integrity of computer systems, which is necessary to pave the way for public acceptance of electronic funds transfer systems, elecronic mail systems, and other potential benefits of the full realization of the capabilities of computer technology," Dreyer stated in his letter.

"In our view, strong laws to properly punish actual wrongdoers is a much more efficient and rational approach than needlessly imposing onerous, unproductive and expensive requirements on the entire industry, regardless of culpability or lack thereof."

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CDC Saw Plug-Compatible Market Blossoming

By Molly Upton
CW Staff

NEW YORK – Within a year of embarking on its plans to offer IBM-compatible subsystems, Control Data Corp. upgraded its estimates of that sector's net profits before taxes (NPBT) from $58 million to $139 million for the period 1972 to 1980.

The CDC end user task force observed in its 1972 report that although the area of plug-compatible peripherals was fraught with risks, the mrketing of subsystems or peripheral facilities appeared to offer "greater long-range benefits with less associated risk."

The task force reports, written in 1972 and 1973, were entered as evidence in the U.S. vs IBM antitrust trial here.

The reports indicate CDC expected it could increase its customer base of 1,500 by between 150 to 200 a year by marketing subsystems to end users.

This approach could also give the firm "better insight for system and OEM planning into the trends, needs, etc. of the ultimate marketplace for all of CDC's services through a more direct exposure to that market," according to the 1972 report.

In addition, the first volume of the reports estimated CDC could reduce costs of products and services used in other CDC markets by about $8 million NPBT.

The report recommended that CDC phase out of the direct replacement business and trend toward the subsystem or "peripheral facility."

Specifically, the report recommended that the off-line print station should continue as an OEM product and be announced to all end users in late June 1972 as CDC's first entry into the end user subsystem or peripheral facility segment.

The firm should further define and initiate a plan of action for the peripheral facility, which could yield $38.3 million net profit before taxes on revenues of $140 million between 1974 and 1980, the 1972 report stated.

In phasing out of the direct replacement market, the firm should make no new investment for the development of peripherals solely for this marketplace.

Although CDC's version of IBM's 3330 disk drive in itself represented a "high-risk" program, the report recommended proceeding with the 33301 because the development cost would be borne by ~~an~~ OEM contractor and the unit, along with the buffered 38301, formed the integral part of the peripheral facility.

"... It appears that we can test the validity of this market for low initial incremental investment," the report said.

CDC should buy the 38301 initially in order to begin shipments in the first quarter of 1973 and minimize initial investment.

The group recommended not pursuing the plug-interchangeable tape market since the firm lacked the physical resources to be "successful with all of the end user programs at the same time." Also, the tape program "contributed least toward the long-term end user goals," CDC said.

CDC's 1972 estimates for profit from the core memory business were overly optimistic.

In 1973, CDC had cut profit estimates from $7 million to $2.9 million.

Sales from the various lines were expected to reach over $60 million in 1974.

The group projected that cumulative cash flow would turn positive in 1978 and cumulative NPBT in 1983.

IBM Trial Documents

The objectives were to:

- "Establish CDC as the major supplier of total services (product, maintenance, training, financial, etc.) to the end user market and consolidate planning toward this goal." CDC observed: "Should IBM be restrained from restricting this activity, CDC would be in a position to capitalize on a market potential larger than the mainframers themselves."
- "Decrease CDC systems costs; OEM costs and customer engineering costs through economizing on scale and increased efficiency. Benefits are estimated to exceed $19 million for 1972-1977."
- "Help stabilize swings in CDC systems and OEM business."

The firm should also "aggressively develop 360/370 system and software expertise and resources required to support end user activity."CDC could use these to plan and develop the mass storage concept in conjunction with data entry and terminal facility plans, the report stated.

Looking at current products, directed at the IBM base assuming a 1% to 4% penetration of peripheral products, CDC in 1973 estimated orders should be $105 million in 1975 and $37.3 million in 1980, totalling $550 million since 1972.

But another estimate that included new products saw orders growing to $130 million in 1980. Contemplated new products included: Winchester replacement, 380 memory, enhanced disk drives and tape drives.

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Need for Competition

Bank Card, EFT Differences Fading: Shenefield

ATLANTA — The Justice Department will keep a close watch on bank-issued credit cards as their capabilities unfold in the context of growing numbers of electronic funds transfer (EFT) systems, its antitrust chief said here recently.

Previously considered only extensions of credit and not able to represent fund transfers, bank cards are now being used by "numerous cardholders" as "a convenient method of undertaking an economic transaction," according to John H. Shenefield, acting Assistant Attorney General of the department's Antitrust Division, speaking before the National Bank Card Convention earlier this month.

The "neat segregation of bank cards from EFT developments may once have been logically defensible, but is increasingly less satisfactory as the lines between the two industries become blurred," Shenefield said.

The introduction of electronic debit or check guarantee cards by the national bank card systems — Visa and Master Charge — will bring these two systems "directly into the mainstream of EFT," he added.

Furthermore, the bank card clearing systems are also potential suppliers for local point-of-sale (POS) clearing networks, Shenefield stated.

Competitive Issues

As a result, "the competitive issues involved in the bank card field are clearly related to the competitive issues presented by EFT," the Assistant Attorney General contended.

Because joint ventures between banks have been a major pattern of organization in these industries, the Justice Department is concerned that inter- and intrasystem competition be maintained in credit cards and developing EFT systems, Shenefield said.

Throughout his address to the National Bank Card Convention, the antitrust head stressed the "uncertainties" involved in the blurring of the line between bank cards and EFT. "Both bank cards and EFT are still in active development. It is too early to be sure we are asking the right questions, much less reaching the right conclusions," he stated.

Shenefield pointed out that even the National Commission on Electronic Funds Transfer (NCEFT), with its final report due to be delivered to the President and Congress next month, has not focused on the competitive aspects of bank credit cards because until very recently, they didn't technically represent fund transfers.

Looking ahead, however, the assistant attorney general noted that "While we now have little cost data or practical experience in the EFT area, the experience in bank cards has been that joint ventures have frequently been used to share the investment and risk-taking necessary to develop national and large regional bank card systems and to obtain their potential scale economics."

Viewed With Skepticism

Because they present opportunities for collusion, joint ventures are viewed with skepticism by the Antitrust Division, Shenefield said. But at the same time, the Justice Department recognizes that "some economic activities cannot be undertaken without cooperation between competitors," he added.

Capital costs and the monopoly characteristics of certain aspects of bank card and EFT systems may necessitate sharing of facilities by competitors, Shenefield stated.

But "in the early years of a new EFT or bank card service, it is of primary importance to give competition between systems ample opportunity to develop, to encourage availability of the widest possible range of products," he told his audience.

"Organizers of an EFT system, therefore, generally should not allow all potential competing operators to join at the onset," Shenefield said. It may turn out that "competition within the system, rather than between systems," may be the teal key, he continued.

Shenefield noted that the Justice Department has struggled with the manner in which bank card and EFT clearing systems could or should develop in its business review of the statewide POS system in Nebraska and its ongoing investigations of POS systems in Iowa, Wisconsin and Maryland.

Nonbank Competitors

Beyond specific bank card and EFT system developments, changes in the computer and communications technologies "promise to pit banks against nonbank competitors. We would like to see entry by nonbank as well as bank vendors of EFT system components," particularly in the processing and communications of economic transaction information, Shenefield said.

"To the extent [that] there is vertical integration in an EFT system, such as bank debit card systems where banks also do the processing, there may be pricing distortions, which we want to avoid," Shenefield explained.

Difficult Questions

There are more difficult competitive questions to be found in the question posed by the sharing of bank card and EFT terminals at the consumer or retail level, the Assistant Attorney General stated.

In addition to posing all the problems associated with the sharing of terminal systems, the sharing of terminals also involves the inability of merchants to install an infinite number of independent terminals in any one retail location, he said.

Once again, Shenefield favored competition rather than mandatory sharing as a means of solving this EFT problem. "Merchants will probably demand terminals that will enable them to serve as many customers as possible. Competition in terminal services should therefore lead to voluntary sharing of the terminals," he said.

"Regardless of who installs the terminal in a merchant location, it is important that each service that could be offered through the terminal be independently priced and that the decision to accept each service be left up to the merchant," Shenefield stated.

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Part & Parcel

Motorola's I.C. Division's MC10803 Memory Interface Function generates memory addresses and provides for the bidirectional transfer of data between a processor subsystem and system main memory or peripheral equipment; the firm said.

By providing arithmetic capabilities at an I/O address output port, the device can unburden the main processor, Motorola said. The MC10803 costs $40 in lots of 100 or more from distributors and Motorola at P.O. Box 20912, Phoenix, Ariz. 85036.

• • •

Monolithic Memory Systems Corp. has introduced a 14M bit memory, the MSC 2601, and a 32K by 16 RAM memory, the MSC 2401.

The 2601 contains its own power supplies, air cooling, timing and control cards, address buffer, termination and register. The unit, built around a 16K by 1 dynamic RAM, can permit addressing up to 8 modules of 768K words, the firm claimed.

It costs less than .25 cent/bit in OEM quantities and fits in a 5.25-in. high chassis, the firm said.

The 2401 is compatible with the Micro 3000 and is powered from a single +5VDC, 2A source, and costs $1,735 in single quantities from 14 Inverness Drive East, Englewood, Colo. 80110.

• • •

Information Magnetics Corp. (IMC) has raised prices 15% on all "Winchester"-type recording head products, specifically the 5636 and 6350 product lines.

Manufacturing costs did not decline to anticipated levels, the firm said from 495 S. Fairview Ave., Goleta, Calif. 93107.

• • •

Sea Data Corp.'s 633M series data acquisition cassette modules are designed for remote use with 12V power sources.

The 633M/8 records 1.2M bytes at 150 byte/sec and has direct memory access mode recording, the company said.

The 633M/12 records .82M words at 100 word/sec, Sea Data said.

The units cost $2,100 and $2,200, respectively, from the firm at 153 California St., Newton, Mass. 02158.

OEM Products

Elographics Sets Position Sensor

OAK RIDGE, Tenn. — The Elographics, Inc. E270 Transparent Pressure-Sensitive Position Sensor is available with electronics, power supplies and cabinetry for use in CRTs.

The sensor is constructed of a plate glass substrate coated with semiconductive metal oxide over which is placed a plastic cover sheet with a transparent conductive coating.

Single quantity prices start at $3,990 from 1976 Oak Ridge Turnpike, Oak Ridge, Tenn. 37830.

Kilobyte Card, Reader Planned

WELLESLEY HILLS, Mass. — A magnetic card reader/writer using a card storing 1K bytes has been introduced by Vertel, Inc.

The Kilobyte card employs four stripes with two F2F channels encoded on each track and is the size of a credit card, the firm said.

The KB-31 Microloader records and reads both channels per stripe on the card in one cycle at 5K byte/min. It cannot be operated unless the card is properly inserted, the firm said.

The Microloader costs $99 in lots of 1,000 without electronics or $258 complete; Kilobyte cards cost about 10 cents each in large quantities. Vertel is at 167 Worcester St., Wellesley Hills, Mass. 02181.

Monolithic Cuts Circuit Prices

SUNNYVALE, Calif. — Monolithic Memoriex Inc. has reduced 100-quantity prices on its 57110/-67110 microprogram controller circuits by 45%, citing higher yields and increased volume.

The 67110J commercial-temperature-range version in ceramic package was cut from $25 to $14 in lots of 100-999, while the 57110D military version was dropped from $55 in the same quantities to $28.

Monolithic Memories is at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Printer Unveiled

SHELTON, Conn. — A printer whose character sizes are said to be programmable has been introduced by Practical Automation, Inc.

The DMTP-6 series of printers is available in three sizes to handle paper 3-7/16 in., 6 in., and 8.5 in. wide. Up to four copies can be produced, the firm claimed. Throughput on a continuous duty basis is 50 char./sec, the firm added.

The DM 101 matrix print head has a seven-needle vertical array set around a two inch circle.

Single quantity prices are in the range of $200 to $380 from the firm at Trap Falls Rd., Shelton, Conn. 06484.

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NEC's 4-Bit Micros Bow

LEXINGTON, Mass. — NEC Microcomputers Inc. has unveiled the Ucom-4 family of 4-bit micros which include a user-specified masked read-only memory (ROM), an arithmetic logic unit, random-access memory (RAM) and I/O lines.

The units are designed for high-volume industrial and consumer products, the firm said. Prices range from $2 to $8 in large quantities.

The Ucom-42 with 1,920 by 10 bits of ROM and 72 instructions costs $6 to $8.

The Ucom-43 has 2K by 8 bits of ROM, 80 instructions and, like the 42, 96 by 4 bits of RAM and 35 I/O lines. It sells for $6 to $8.

The Ucom-44 costs between $2 and $3 and has 1K by 8 bit ROM, 64 by 4 bit RAM, 35 I/O lines and 58 instructions.

The Ucom-45 has 640 by 8 bit ROM, 32 by 4 bit RAM, 21 I/O lines and 58 instructions and costs about $2 in quantity, according to the firm at Five Militia Drive, Lexington, Mass. 02173.

To Set Industry Ethics

Makers' Association Seen Needed

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — A call for a microcomptuer manufacturing association was made at Personal Computing '77, a recent microcomputing hobby show here.

Microcosm

Chris Rutkowski, president of Technical Design Labs, Inc., of Princeton, N.J., made the plea, noting that the industry needs something to establish industry ethics.

Rutkowski sees such an organization filling roles as registering all microcomputer distributors and dealers; registering software; working on standardization, for example the S-100 bus question, and possibly even evaluating claims of board compatibility.

The association is needed to give the fast growing industry some form of legitimacy, he said.

There are people that are selling products that they don't have and possibly never will and people that are taking customer's money with no intention of delivering a product, Rutkowski said.

Companies are making compatibility claims for products that are totally false and other forms of disreputable conduct are taking place, he said.

Conduct such as this is eroding confidence in the industry and hurting the legitimate firms, both large and small, who are trying to conduct their businesses in an honest manner, he added.

The association he sees ideally should be sponsored and controlled by either a professional society or a magazine, since the industry is proving unable to police itself, he said.

Rutkowski is at Technical Design Labs, Inc. Research Park, Building 11, 1101 State Rd., Princeton, N.J. 08540.

Data I/O 16 Loads Proms 1M Byte/Hr

ISSAQUAH, Wash. — Data I/O Corp. unveiled its Model 16 gang programmer which is said to be the first programmable read-only memory (Prom) programmer to deliver an erasable programmable read-only memory (Eprom) programming rate approaching 1M byte/hour.

The Model 16 programs 16 Proms simultaneously, performs sum-check tests automatically to guarantee data integrity and checks continuity of programmer, socket and Eprom, the firm claimed.

The programmer includes RS-232C serial I/O with selectable rates of 110-, 300-, 1,200-, 2,400-, 4,800- or 9,600 bit/sec and operates in asynchronous, half or full-duplex modes.

A 2K-byte by 8-bit expandable random-access memory (RAM) is standard.

Prices start at $4,800 from Data I/O at P.O. Box 308, Issaquah, Wash. 98027.

Intel Offers 5V, 8K Eprom Upgradeable to 16K ROM

SANTA CLARA, Calif. — Intel Corp. has introduced what it said is the first 5-volt, 8K-bit Eprom (erasable programmable read-only memory), the 2758.

Compared with Intel's 2708, the new 2758 can be operated on a single +5-volt TTL power supply, is directly upgradable to 16K masked ROM and allows one to change system storage capacity in 1K-byte increments with no design changes, the firm said.

The 2716 16K Eprom is directly compatible with the 2758 and 2316E, Intel added.

The unit also features reduced power and cooling costs, programming rates 2 to 2,000 times faster, depending on the number of bytes stored at a time, compared with the 2708, Intel said.

The 2758 stores 1K by 8 bits, is TTL-compatible in all modes and has a maximum access time of 450 nsec. It is available from stock in standard Eprom package (24-pin package with window for ultraviolet-light erasure) at $26.60 in 100-up quantities from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Quay's 90 Is Z-80 Based

FREEHOLD, N.J. — Quay Corp.'s 90 MPS is a single board Z-80 based microcomputer system for OEM systems and development work.

The basic board includes 6K bytes of memory, two Z-80 parallel I/O chips which provide 4 parallel I/O ports, an RS-232C interface, 2.5 MHz. crystal clock, a Z-80 counter timer, and a prom programmer for 2708 type Eproms.

The 4K dynamic RAM can be expanded to 65K bytes using 16K x 1 devices, and a total of 7K bytes of 2708 Eprom can be installed on the board, Quay said.

The basic Quay 90 MPS is priced at $695 in single quantity and $500 in OEM quantities from P.O. Box 386, Freehold, N.J. 07728.

Panasonic Has 4-Bit Micros

SECAUCUS, N.J. — Panasonic Electronic Components is offering the MN1400 series of 4-bit microcomputers that contain 75 instructions and have a 10 microsec instruction cycle time.

There are three models: MN1400, 1402 and 1498, in addition to an evaluator chip, the MN1499, all made by parent company Matsushita.

The MN1400 series incorporates a number of functions previously included in auxiliary circuitry such as an 8-bit presettable countertimer, clock generator, 1K by 8 bits instruction ROM and I/O ports.

The price is $8.50 in lots of 1,000 from the firm at One Panasonic Way, Secaucus, N.J. 07094.

AMI Expedites Ion Implant

SANTA CLARA, Calif. — American Microsystems, Inc. (AMI) reports doubling the production rate of implanted silicon wafers used in making MOS integrated circuits by adding Varian Extrion Division implantation systems.

"Implantation time is half," Dan Gracia, production manager, noted. "The process is more controllable and the costs are lower."

AMI is using a total of three Extrion systems to implant boron and phosphorous ions in the silicon wafers.

The ion implanters are being used in the production of both custom and standard circuits, employing C-MOS, P-MOS and N-MOS processes.

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International News

Retailers Taking Gradual Approach

West Europeans Proving Slow to Install POS

By Don Ryder

Special to CW

Automation has made far greater strides into U.S. retailing operations than into European ones in the last five years. In fact, between 1971 and 1976, 10 point-of-sale (POS) devices were shipped to U.S. retailers for every one shipped to Western European retail outlets.

There are various reasons for this imbalance. For one thing, Europeans have not yet agreed on a standard equivalent to the U.S. Universal Product Code (UPC).

Europeans also are less likely to drive to do their shopping than U.S. shoppers. Often they just walk to a nearby shop, generally a small neighborhood one. Thus there are fewer big supermarkets that can cost-justify extensive POS installations.

But all that is starting to change.

NCR reported a healthy order book for both its NCR 255 checkout system and its NCR 280 general merchandising terminal system.

France, the European leader in terms of numbers of supermarkets and hypermarkets, reported a large number of NCR 255 installations with prominent names such as Carefour, Codec and Euromarche among the users.

IBM has until recently concentrated its European success in department stores. A recent installation of this type is at Bainbridge in Newcastle, England, which houses an IBM 3650 retail store system with 110 cash registers and automatic magnetic wording of price tickets.

IBM also reported an extensive 3650 installation (over 1,000 terminals) in West Germany's Quelle chain. Until now, IBM's 3660 supermarket system has had few European takers, but at least one Dutch supermarket is evaluating an IBM laser-beam checkout scanning system.

Sweda International has been actively marketing its POS system throughout Europe and has now achieved a customer base in many European countries, including the UK, Italy and Spain.

A major factor accounting for this success is the fact that its systems have been specifically designed and written for the European retail industry, according to Sweda.

A country-by-country survey of European POS activity provides the following summary:

- France: The leader in installation growth in Western Europe because of the early development of hypermarkets and supermarkets and because a high degree of shopper acceptance of modern retailing techniques. Also, the chains and large department stores in France were quick to experiment with POS in terms of partial implementation with a view to later full-scale installation.
- West Germany: The biggest and richest computer market in Europe. Now the leader in annual shipments of POS, West Germany is gradually overtaking France in total number of installations. Coupled with the strongest economy in West Europe, is a high degree of consumer acceptance of POS.
- Switzerland: Advanced in degree of acceptance of POS. Installations went in early and Switzerland ranks high in European league table if allowances are made for the smaller computer population.
- Scandinavia: There are some big installations, particularly in Sweden and Denmark, and there is consumer acceptance, but the ultimate total size of the market is less than half that found in West Germany, France or the UK. This simply reflects the relative size of the various national economies.
- Italy: Surprisingly high POS acceptance in the supermarkets and cash-and-carry installations in the north of the country.
- UK: Poor economic climate has kept UK from growth in POS installations comparable to West Germany and France. Management has taken a wait-and-see attitude and most installations have been for trial purposes only. The situation is now beginning to change, but consumer resistance could be a problem.

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300 bed community hospital in southeastern Wisconsin is seeking an ambitious self-starter to design, program and implement financial and patient management applications for IBM 370 hardware utilizing COBOL, BAL and CICS. The successful candidate will have the ability to work independently, function as a project leader and communicate well with user departments. Background should include formal education coupled with significant accomplishments in application analysis and programming. Experience in DBMS and system programming an asset. Send resume and salary rqmts to: Personnel Dept., West Allis Memorial Hospital, 8901 W. Lincoln Ave., West Allis, Wisconsin 53227.

SYSTEMS PROGRAMMERS

Leading private educational institution in the NYC metropolitan area seeks additional staff for our academic computer center. Center has latest DEC-10 system hardware, including KL-10 processor.

Candidates must have DEC-10 Systems experience including the following:

- Knowledge of operating systems.
- Systems programming
- Assembly language programming
- State-of-the-art programming techniques
- Capability of supervising software design, development and maintenance.

Excellent benefits - 4 weeks annual vacation, tuition assistance and growth environment. Send resumes to:

Mr. James M. Nast
Dir. of Personnel Relations
Stevens Institute of Technology
Hoboken, N.J. 07030
Equal Opportunity Employer M/F

Asst. Director-MIS

Rare opportunity to be +2 in large Eastern Mass. company. Must be strong administrator with 370-DOS experience in operations and systems. $20 - $24,000 (Fee Paid). Contact Jim Staunton

(617) 423-6440.

All Positions Fee Paid

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FINANCIAL & EDP PERSONNEL SPECIALISTS

COMPUTER PROGRAMMER

We have an immediate opening in our corporate data processing department, which services manufacturing and distribution facilities throughout the United States, for an experienced Programmer. Experience of more than 2 years with a manufacturing company is required. CICS, VSAM and DL-1 data base systems experience a definite plus.

Equipment consists of IBM 370-135 DOS-VS installation with telecommunications. Languages: COBOL and Assemblers.

We offer an outstanding work environment and an excellent range of benefits. Call for appointment or send resume for confidential consideration. Include salary history and requirement.

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FACULTY POSITION PAN AMERICAN UNIVERSITY

School of Business Administration

Assistant or Associate Professor beginning January, 1978. Should hold an earned doctorate in Computer Science, Management Information Systems or related field. Teaching and/or industry experience is desirable. Salary range for the nine-month academic year is $17,800 - $21,600 depending on qualifications.

Closing date for receiving completed applications for above position, including resumes, copies of transcripts and list of references is October 31, 1977. Contact Dean R.N. McMichael, School of Business Administration, Pan American University, Edinburg, Texas 78539.

Pan American University is an Equal Opportunity/Affirmative Action Educational Institution and Employer.

PROGRAMMER ANALYSTS

with

Retail Experience

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Advancement in Laboratory and Medical Data Products.

Digital's Laboratory Data Products and Medical Data Products group in Marlboro, Massachusetts are where both ideas and professionals have a unique upward mobility. Developing and marketing products for the medical and research communities, we actively encourage ideas and proposals from professionals at all levels. The result . . . an exciting environment with a high degree of professional growth and advancement.

If you want your contributions to have real impact, LDP in Marlboro is where you should be!

Senior Programmer
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Working with a team of systems programmers you'll be responsible for developing product test tools, writing product test drivers and quality assurance plans for Standard MUMPS. You will be a member of the development team and will be a key contributor in assuring a high quality product is distributed to DIGITAL customers. A technical degree or equivalent, knowledge of Operating System design and PDP-11 Assembly language programming are all essential. A working knowledge of MUMPS would be very desirable.

Senior Programmer
MUMPS Application

This is your opportunity to be a major contributor to the development of a new Digital Medical Information System. You will work with a team of skilled programmers in the design of a Medical Record, Accounts Receivable and Scheduling system for group practice environments.

The individual we're seeking will be a dynamic, self-motivated professional with a technical degree or equivalent, 3-4 years experience in MUMPS application coding. Effective communications skills and the ability to productively interact with Marketing and Sales are also essential.

Senior Programmer
Applications

We're seeking a self-starter who can work effectively with Marketing and Sales to define a new product in the field of industrial research and development. You must be able to work both independently and with other groups.

This position requires 2-3 years programming experience in industrial applications such as Process Engineering, Chemistry, Manufacturing, R & D Lab, or Testing Lab. You must also have 1-2 years experience with RSX-11 M or D plus a technical degree or equivalent. Real-Time Data Acquisition experience would be a definite asset.

We are also seeking individuals with a solid background in Real-Time Data Acquisition, Signal Processing, and/or writing supporting software for new hardware peripherals.

The challenge and opportunities you've been looking for are waiting for you at Digital in Marlboro. Please forward your resume, including salary history and requirements and indicating area of interest to Carol Reed, Digital Equipment Corporation, 200 Forest Street, Marlboro, Massachusetts 01752. We are an equal opportunity employer m/f.

We're the company looking for people.

digital

SYCOR

SYCOR CONTINUES ITS PROGRAM OF NATIONAL EXPANSION!

As a leading force in the tehnological development and manufacture of distributed data processing systems, our need for Systems Engineering and Sales Professionals continues to grow. Openings exist in major cities throughout the U.S. for career-oriented people in the following areas:

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COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

SALES REPRESENTATIVES

Requires a minimum of 3 years terminal, peripheral or small systems sales experience, plus a general knowledge of D. applications including communications. Candidates must display the proven ability to meet sales quotas for a complete line of computer products and support services.

We offer a competitive range of salaries, comprehensive benefits and highly visible opportunities for future growth. To arrange an interview send your resume to:

SYCOR INC

Gopi R. Jindal
SYCOR, INC.
100 Phoenix Drive
Ann Arbor, MI 48104
(313) 995-1156

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

"Sycor Puts Computer Power Where the Work Is"

SYCOR

DATA PROCESSING PROFESSIONALS

Due to recent internal expansion, Lennox Industries Inc., a nationally recognized leader in the heating and air conditioning field, has positions available for Systems Analysts, Senior Applications Programmers and Applications Programmers.

Processing environment is a 370/158 under OS/VS1 providing real time and batch teleprocessing services for many locations throughout the United States and Canada.

These positions offer a competitive compensation and benefit package and excellent opportunity for growth.

Please submit a resume which includes salary history to:

John Dugan
Lennox Industries Inc.
200 S. 12th Avenue
Marshalltown, Iowa 50158
An Equal Opportunity Employer

EXPANSION

Within the next year, more than 100 PROGRAMMERS and PROGRAMMER/ANALYSTS will be moving to one of the Midwest's most beautiful cities, a city of 450,000 people living in an unpolluted atmosphere with a moderate cost of living and the cultural advantages of a city twice it's size.

Our client, a large securities firm, is expanding their EDP staff and has immediate openings for PROGRAMMERS and PROGRAMMER/ANALYSTS. The successful individuals will have 1 to 5 years experience on large IBM systems operating OS, will be proficient in COBOL, and have exposure to IMS Data Base and DL/I. A degree and knowledge of financial or insurance applications will prove a great plus. Starting salaries range from $12-18,000.

The company offers a unique, very advanced training and incentive program along with excellent benefits. Advancement potential is among the best in the country.

For further information, rush your resume today or call Jeff Holmes in complete professional confidence.

dorsey love & associates inc.

P.O. Box 4486, Glenstone Station
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DHAHRAN, SAUDI ARABIA

The University of Petroleum and Minerals, Dhahran, Saudi Arabia, will have graduate faculty positions open for the Academic Year 1978-79 for teaching/research in the areas of Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering and Mathematics. The responsibilities include:

(A) Six contact hours teaching load per semester
(B) Research in individual's area of specialization
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Applicants should hold PhD degree and should have at least five years experience in research/graduate education.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, air conditioned furnished housing will be provided, and free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten months duty each year with two months paid vacation and possibility of participation in University's ongoing Summer programs with adequate additional compensation.

Apply with complete resume on academic and professional background, list of references, and a complete list of publications with clear indication of those papers published in refereed professional magazines/journals, research details, and with copies of degrees including personal data such as family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

University of Petroleum and Minerals
c/o Saudi Arabian Educational Mission
2223 West Loop South, Suite 400
Houston, Texas 77027

CAREER OPPORTUNITIES

With one of the world's most advanced computer complexes

The Los Alamos Scientific Laboratory, a multi-program national research organization, is seeking mature professionals who have the demonstrated ability to contribute to our programs in computational science. The installed major computers include a CRAY-1, four CDC 7600s, two CDC 6600s, two CDC Cyber 70 Model 73s. and IBM 1360 Photostore, and an IBM 370/148-3850 Mass Storage System. These computers are linked together through an Integrated Computer Network (ICN), which also provides terminal access to the timesharing systems. Remote Terminals number in excess of 850.

CAREER OPPORTUNITIES - COMPUTER PROFESSIONALS

OPPORTUNITY #1	Will propose and lead innovative applied research projects in the area of large-machine operating systems. The successful candidate will have a relevant Ph.D plus strong experience in operating systems and leadership ability. Experience in one or more of the following areas is highly desirable: systems programming, storage systems, computer architecture, networking, or distributed computing. Publication of research results is expected.
OPPORTUNITY #2	Will participate in the design and development of an operating system for the CRAY-1 computer. A relevant Ph.D, and demonstrated knowledge is required in one of the following areas: operating and storage systems, systems programming; performance modeling and analysis, computer architecture, distributed computing and networking.
OPPORTUNITY #3	Will propose and conduct applied research in the area of performance measurement, modeling, and analysis. The successful candidate will have a relevant Ph.D, experience in performance measurement, and one or more of the following areas: operating systems, computer architecture, distributed computing or networking. Publication of results is expected.
OPPORTUNITY #4	Will be responsible for system maintenance and support software for UNIX systems and for integration of PDP-11/70s into the ICN. A degree in relevant field plus experience with UNIX systems and PDP-11 hardware is required.
OPPORTUNITY #5	Will work in applied research in support of the LASL ICN and other staff members involved in the design and implementation of ICN systems modules. Must have research experience in the area of computer networks and have a knowledge of (CDC 7600 class) operating systems, interface components, network control components, and remote termianls. A relevant degree is required.
OPPORTUNITY #6	Will provide hardware IC designs for interfacing CDC, DEC and other computers. A B.S./M.S. in Computer Science or Electrical Engineering with solid experience in computer systems, digital design, and hardware input/output interfaces is essential.
OPPORTUNITY #7	Will be responsible for designing, coding and debugging real-time programs in assembly language. Will participate in the design and implementation of system modules for the ICN. The successful candidate will have a BS/MS degree in a related field and experience with minicomputer operating systems. Knowledge of minicomputer hardware electronics interfaces, computer network design and network interface components is essential.

CAREER OPPORTUNITIES - COMPUTER MAINTENANCE TECHNICIANS

OPPORTUNITY #8	Will fabricate, checkout, and maintain a large variety of computer interface and communications equipment. The successful candidate will have more than 3 years experience with chassis layout, fabrication, wiring harnesses, and digital logic circuits. Technical instituted graduate is preferred.
OPPORTUNITY #9	Will maintain computer based computer output microfilm systems including minicomputers, analog and digital circuitry, computer peripherals, high speed automatic cameras and film processing equipment. Position requires 4 or more years experience in the above areas. Experience on the Information Interantional FR 80 is desirable.
OPPORTUNITY #10	Will maintain high speed automatic cameras, film processors, precision positioning mechanisms, and related equipment. The successful candidate will have 4 or more years experience in film processing and interest in the field of minicomputers.

Individuals interested in these or other career opportunities should submit a complete resume and salary history incomplete confidence to:

los alamos
SCIENTIFIC LABORATORY
OF THE UNIVERSITY OF CALIFORNIA

Charles M. Mikkelson, Employment Representative
Division - 77-BF
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545
Interview will be arranged for qualified candidates.

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER
Women, Minorities, Veterans and Handicapped Urged to Apply
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SYSTEM SOFTWARE DEVELOPMENT PERSONNEL

The VIP Agency of Palo Alto has a number of challenging opportunities to offer EDP professionals with an interest in the development of system and application software:

- Communications
- Operating Systems
- Data Base/Data Management
- Real Time Communication and Process Control

If you have an interest in mini/micro processor software development call (collect) (415) 493-3111.

VIP

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FIELD ENGINEERS

Two field engineers: one junior level with experience and one senior level. Duties involve installation and maintenance of Data General systems configurations such as disk, tape, line printer and CRT. Two years technical training. Associate degree or equivalent. $15,000 to $20,000. All company benefits including dental. Profit sharing after one year. Send Resume to P.O. Box 924, Redondo Beach, Calif. 90277.

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SAN DIEGO LOCATION

To lead a group of 10 engineers and programmers engaged in the design of

ON-LINE HIGH-SPEED MICR/OCR READER - SORTER SYSTEMS

The selected individual must have a broad background in the design of software and/or hardware for medium scale business data processing systems and their application in the field of financial data processing. Strong knowledge in all of the following is desired plus recent and successful design experience in at least two of them, preferably the latter two:

- MICRO/OCR READER - SORTER PERIPHERAL DEVICES
- READER - SORTER CONTROLLERS
- FINANCIAL APPLICATION PROGRAMS SUCH AS TRANSIT AND PROOF OF DEPOSIT
- SYSTEM SOFTWARE INTENDED OR EXTENDED FOR ON-LINE READER-SORTER CONTROL

The position involves direction of the ongoing design activities plus heavy coordination/liaison with OEM vendors of document handling devices, hardware and software quality assurance organizations, corporate program management, and other NCR divisions.

Technical management experience is essential as the design organization is expected to grow.

BSEE or BCS or equivalent; MS desirable. Minimum of 10 years' applicable experience. Salary commensurate with ability and experience.

Employees will enjoy excellent salary and top working conditions, with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents.

To arragne an appointment, please send resume immediately including salary history, training and experience to the professional Placement Office at the address below.

NCR

Data Processing Division
16575 W. Bernardo Drive
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SOFTWARE PRODUCT DEVELOPMENT

Link your career to the unprecedented growth of ADR's Software Products Division. Participate in defining, developing, and enhancing our software product line. WE are interested in dedicated software professionals who are capable of doing advanced software development. If you have proven outstanding talents in the job areas shown below, we believe you will want to consider career opportunities at ADR.

SYSTEMS PROGRAMMERS

- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Strong IBM Assembler language background.
- On-line systems development experience in an OS environment.
- At least 2 years experience or a computer science degree.
- Familiarity with DOS and CICS desirable.

MACRO PROGRAMMERS

- Experienced in high-level language interface to Data Base/Data Communications systems.
- IBM Assembler background necessary.
- Working knowledge of COBOL essential.

Some Facts About ADR . . . founded in 1959 . . . development personnel average well over 8 years with company . . . field and sales personnel average over 5 years . . . stable (over $15 million last year) . . . traded on American Stock Exchange . . . employs over 300 people . . . small enough for personal recognition . . . informal and flexible environment . . . representatives throughout the world . . . software product line diverse, versatile, state-of-the-art . . . excellent employee benefits.

Please send resume with full details including current salary and position desired in complete confidence to: Personnel Director Software Products Division

APPLIED DATA RESEARCH, INC.
Route 206 Center, CN 8
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Data Processing

Opportunities in Information Systems Land O' Lakes, Inc.

Everybody is looking for D P professionals, right? So why should you talk to LAND O'LAKES?

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- LAND O'LAKES is based in beautiful Minneapolis, MN, "City of Lakes", where you will find a unique cultural, educational, and living/working environment

PROGRAMMERS — We have current opportunities for top notch programmers to work with a variety of applications including distribution, manufacturing and finance/accounting. We have several openings for individuals with 2 to 4 years experience in ANSI/COBOL and multilanguage programming along with remote entry utilizing IBM 370 series computers in OS/VS with CICS/VS.

SYSTEMS ANALYST — 2 to 4 years experience with the development and implementation of systems for manufacturing, product cost and inventory control plans. People having good communication skills and experience with remote users of distributed processing. College degree in Computer Science and experience in IBM hardware is highly desirable.

Write or call: Bill Goodwin, LANO O'LAKES, INC. P.O. Box 116, Minneapolis, MN. 55440. Toll-free 1-800-328-7566.

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LAND O LAKES

PROGRAMMING CAREER OPPORTUNITIES

CONTROL DATA CORPORATION is seeking. sionals who have IBM background to work on our Mass Storage System which is a major new development in the computer industry.

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Minimum of 3 years experience in the design of IBM operating system related software. Must possess internals knowledge in the state-of-the-art IBM virtual systems. Requires experience in assembler language, utilities, data management, job management and supervisor services. Knowledge of TSO, JES 3 and VSAM is desirable. Requires good organizational and documentation skills. Development activities are conducted in a structured design/programming team environment.

* SOFTWARE SUPPORT SPECIALISTS

Minimum of 3 years IBM system programming experience with internal knowledge of MVT, VS1, SVS or MVS. Knowledge of O/S utilities, data management, job management and supervisor services required. Must be willing to accept short term domestic and European travel assignments.

* SYSTEM PROGRAMMERS

Minimum of 3 years IBM system programming experience with internal knowledge of MVT, VS 1, SVS or MVS. Knowledge of utilities, data management, job management and supervisor services required. Knowledge of TSO desirable. Should have at least 3 years of IBM assembler coding experience. Experience in structured programming environment is desirable.

WE OFFER A LIBERAL COMPENSATION AND BENEFIT PACKAGE. PLEASE SEND RESUME INCLUDING SALARY HISTORY OR CALL:

Peggy L. Bernhardt
PERIPHERAL SYSTEMS GROUP
2200 Berkshire Lane
Plymouth, Minnesota 55441
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CONTROL DATA CORPORATION

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Good talent deserves outstanding opportunities. At Harris Computer Systems Division WE HAVE BOTH!

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If you are a data processing professional and feel that you would like to make a change with a fast growing Fortune 500 company such as Harris, we would appreciate your taking the time to complete and clip out the information requested below. This will be held in the strictest confidence.

I am interested in the following areas:

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__Engineering Design & Development

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NAME______________________________

ADDRESS____________________________

CITY____________ STATE____________ ZIP________

__ Enclosed is my personal resume for your convenience.

Attn: W.D. Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

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Provide training and technical support to assist time sharing users at Corporate headquarters. A Bachelors degree or equivalent in Computer Science, Statistics or Math and two years of FORTRAN experience are required.

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Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

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NCR DATA PROCESSING DIVISION
16575 W. Bernardo Drive, San Diego, Calif 92127
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SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
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Hillsborough County Civil Service
700 Twiggs St., 1st Floor
P.O. Box 1110
Tampa, FL 33601
Equal Opportunity Employer

SYSTEMS PROGRAMMER

We are a major force in Iowa banking and have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of DOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the contentment of working in a pleasant midwestern city, please submit your resume to:

Ronald D. Long, AVP
Brenco Automation Center, Inc.
717 Mulberry, Suite 503
Des Moines, Iowa 50309
A subsidiary of Brenton Banks, Inc.

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Career positinns are open that require strong computer skills in Fortran, Basic and Mark IV plus business or marketing knowledge. Person selected will design, implement and maintain an M.I.S. for business units and do forecasting and statistical analysis.

Position will involve file coordination of existing systems and management of new reporting formats. Past experience with M.I.S. design, handling and usage needed.

Excellent opportunity to work with high level languages, IBM 370orCyber73 computers, and the latest Tek graphic terminals. Strong future potential in EDP, bosiness or marketing management.

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PROJECT LEADER

Autonomous div. of N.Y.S mfr has new key spot open through promotion. Min 3 yrs. mfg systems exp. required to head up team. Must design, program & implement plant wide business system. FORTRAN and/or COBOL. RJE site. $20,000 (Fee paid) Contact P. Siegal.

ROBERT HALF
PERSONNEL AGENCIES
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Buffalo, N.Y. 14202
(716) 842-0801

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Personnel
Mission Research Corp.
P.O. Drawer 719
Senta Berbara, CA 93102
Equal Opportunity Employer

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Put your computer experience on the line — at Richmond Engineering, a leading Virginia custom builder end fabricator whose recent tripling of sales has created immediate opportunities for additional professional personnel:

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COMPUTER ANALYST: Will manage computer system of corporate engineering department. Required: engineering degree and experience with FORTRAN IV; knowledge of heat transfer and structural enalysis systems ill also be helpful.

RECO offers excellent starting salaries and a full range of company benefits. To essure consideration for one of these career positions, please call or write the Personnel Department.

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(804) 644-2611
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International communications and manufacturing giant. Design, implementation, debugging, flow charting and programming of manufacturing systems. IBM 360/370, ANS-COBOL. $23,000. FEE PAID.

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Dynamic batch and on-line environment. Participate in a progressive growth. Accountable for planning, administering and coordinating all data processing functions. Emphasis on planning and administration. Located in midst of first class hunting, fishing, skiing and general good quality living. Send resume and salary requirements to Personnel Department, Blue Cross of Montana, P.O. Box 5004, Great Falls, Montana 59403 or phone (406) 761-7310. An equal opportunity employer M/F.

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Acquisition of marketable packages on purchase or royalty basis, with or without employment of author. Packages desired: DOS/VS Op. System enhancements/extensions; DOS/VS or OS/VS utilities; Workload and capacity measurement/forecasting, Programmer productivity aides or evaluators; on-line JCL Systems; Batch, On-line and RJE turnaround/response analyzers; generalized data edit system; or similar. Send brief resume and package description to: R&D Systems Marketing, P.O. Box 10342, Elmwood, CT 06110.

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PROGRAMMER

NCR 151 192K B-3

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Data Processing

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(Northwest Chicago Suburb)

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3 POSITIONS PROGRAMMER/ ANALYSTS

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- Create a transactional input stream representing the scope of the online system.
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Ongoing Responsibilities:

- Advise and consult senior corporate and ACS managemant on system reliability.
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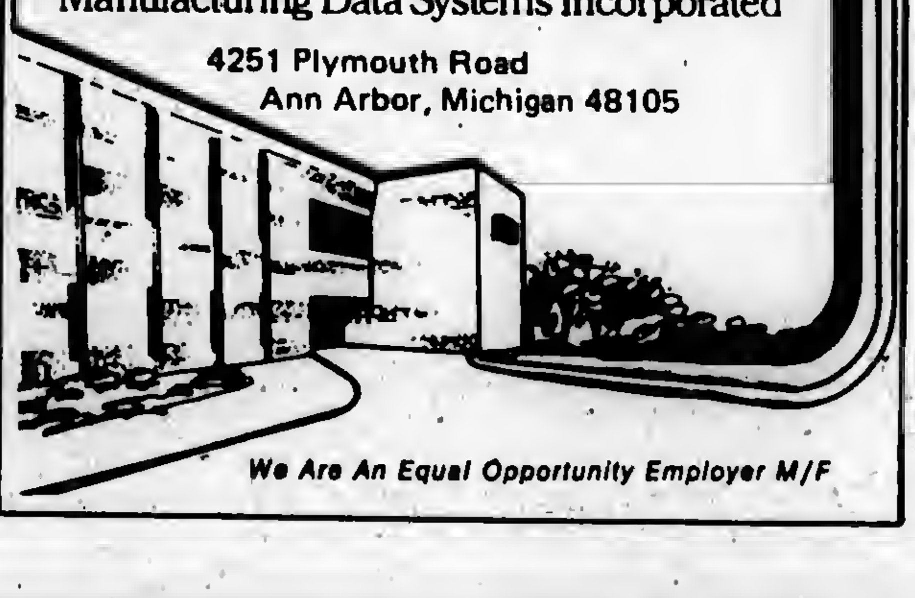

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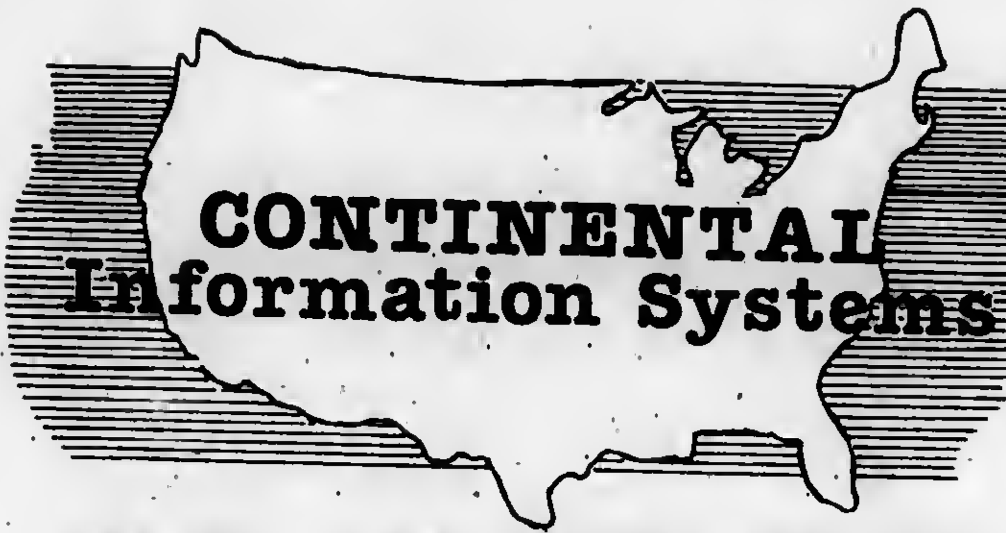

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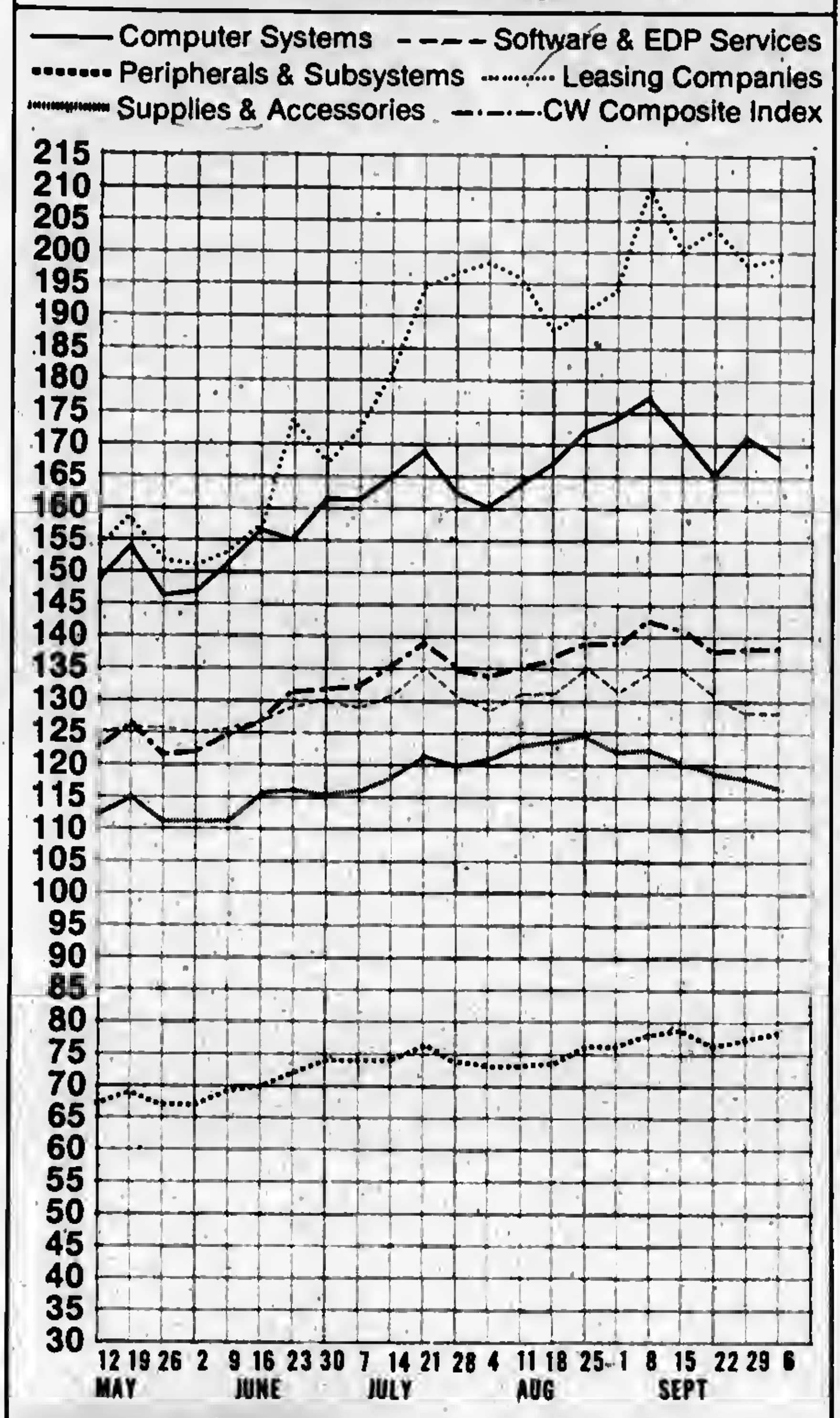

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Revenue	705,623	e604,271
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Earnings	29,634	16,376
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Three Months Ended June 30

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Shr Ernd	$.30	$.35
Revenue	5,136,220	3,901,376
Tex Cred	.....	200,000
Earnings	406,530	423,051
6 Mo Shr	.55	.62
Revenue	9,625,404	7,232,797
Tex Cred	.....	363,000
Earnings	744,265	755,766

APPLIED MAGNETICS
Three Months Ended June 30

	1677	1976
Shr Ernd	.....	$.10
Revenue	$17,086,000	16,054,000
Earnings	a(2,753,000)	421,000
9 Mo Shr	.....	.20
Revenue	46,350,000	45,629,000
Eernings	e(3,588,000)	842,000

e-Raflects provision for inventory writedown and reversal of praviously recognized tex benefit of $2,100,000.

ATLANTIC RESEARCH
Six Months Ended June 30

	1677	1676
Shr Ernd	$.07	.....
Revenue	15,856,000	$11,542,000
Earnings	465,000	151,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 5, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMOAHL CORP	22- 44	39 1/2	-4 1/2	-10.2
N	BURROUGHS CORR	55- 91	66 3/6	- 3/6	-0.5
O	COMPOTER AUTOMATION	18- 30	23 1/4	-1 1/4	-5.1
N	CCNTROL OATA CORP	20- 26	21 1/4	+1 5/8	+8.2
O	CRAY RESEARCH INC	15- 29	24	-1 3/4	-6.7
N	OATA GENERAL COPR	35- 51	46 1/4	-2 1/4	-4.6
N	OATAROINT CCRP	18- 32	29 3/8	- 1/2	-1.6
N	OIGITAL EQUIPMENT	37- 53	46 1/2	-1	-2.1
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	10	- 1/2	-4.7
C	FCUR-PHASE SYS7FMS	13- 19	17 3/4	- 1/2	-2.7
N	FCX6ORO	42- 54	45 3/4	+1 1/2	+3.3
O	GENERAL AUTCMATION	6- 9	6 7/8	+ 3/8	+5.7
O	GRI COMRUTER COFP	1- 1	1/2	0	0.0
N	HEWLETT-RACKARD CC	69- 87	76	-2	-2.5
N	HONEYWELL INC	44- 55	44 7/8	- 1/2	-1.1
N	IBM	245-266	257 3/8	-2 1/8	-0.6
O	MANAGEMENT ASSIST	5- 9	7 5/8	- 3/8	-4.6
O	MEMOREX	23- 34	29 3/4	-1 1/8	-3.6
C	MICRODATA CORP	7- 18	13 1/8	+ 7/8	+7.1
C	MODULAR CCMPUTER SYS	5- 8	6 3/8	- 3/8	-5.5
N	NCR	32- 47	46	- 1/2	-1.0
O	PRIME CCMPUTER INC	12- 23	20 5/8	- 1/8	-0.6
N	PERKIN-ELMER	17- 22	20	0	0.0
N	RAYTHEON CO	16- 33	30 1/2	+ 3/4	+2.5
N	SPERRY RAND	33- 42	32 1/2	-1	-2.9
O	SYCOR INC	8- 15	11 1/2	- 3/8	-3.1
A	SYSTEMS ENG. LABS	5- 8	6 3/8	- 1/2	-7.2
A	WANG LABS.	10- 14	12 3/8	+ 1/4	+2.0

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS COFP	3- 5	4 3/4	- 1/8	-2.5
O	BCOTHE CUURIER COPP	8- 10	10 1/4	+ 1/4	+2.5
C	CCMOISCC INC	10- 13	12 1/4	0	0.0
A	CCMMERCE GRCUR CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	- 1/6	-11.1
M	OATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2 1/8	+ 1/4	+13.3
N	OPF INC	6- 9	9 3/8	+ 1/4	+2.7
N	ITEL	13- 22	20	-1	-4.7
N	LEASCC CORP	19- 27	23 3/4	+ 3/8	+1.6
O	LEASPAC CORP	1- 2	1 1/4	0	0.0
C	NRG INC	1- 1	1/6	0	0.0
A	PIONEER TEX CORP	5- 11	5 1/2	- 1/8	-2.2
N	U.S. LEASING	10- 15	13 3/8	+ 5/8	+4.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
C-T-C PRICES APE BIO PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DCLLAR

SOFTWARE C EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCEO CCMP TECH	1- 2	1/2	- 1/8	-20.0
O	ANACOMP INC	7- 10	8 1/2	+ 1/4	+3.0
A	APPLIEO OATA RES.	5- 10	7 3/4	+ 1/4	+3.3
N	AUTOMATIC OATA PROC	23- 30	25 3/4	- 3/R	-1.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	- 1/4	-11.7
O	CCMRU-SERV NETWORK	10- 15	11	- 1/2	-4.3
O	COMP ELEC7ION SYS7MS	6- 10	9	0	0.0
O	COMPUTER HORIZGNS	1- 1	1 1/4	0	0.0
C	COMRUTER NETWORK	6- 11	9 7/8	- 5/8	-5.9
N	COMPUTER SCIENCES	7- 9	8 5/R	+ 3/8	+4.5
O	COMRUTER TASK GRCUP	1- 2	2	0	0.0
C	COMPU7ER USAGE	1- 3	1 3/6	+ 1/6	+10.0
O	COMSHARE	5- 8	7 1/4	+ 1/4	+3.5
O	OATA CIMENSIGNS INC	3- 5	3 1/8	0	0.0
O	OATATAB	1- 2	1 3/R	- 1/8	-8.3
N	ELECTRONIC OATA SYS.	15- 20	15 7/8	+ 3/8	+2.4
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMRUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSCCIATES	3- 4	4 1/4	+ 3/8	+9.6
O	KEYOATA CORP	2- 3	1 3/4	0	0.0
A	LOGICON	7- 17	11 1/2	+ 3/8	+3.3
A	MANAGEMENT OATA	1- 2	1 3/8	- 3/8	-21.4
A	NATIONAL CSS INC	19- 27	26 3/4	+1 5/8	+6.4
O	NATIONAL OATA CCRP	4- 7	7 1/6	+ 1/4	+3.6
A	ON LINE SYSTEMS INC	16- 22	16 7/8	+ 1/2	+3.0
N	PLANNING RESEARCH	3- 6	4 3/4	- 1/8	-2.5
O	RRCGRAMMING C SYS	1- 1	1/4	0	0.0
O	RAPIOATA INC	2- 3	2 1/6	- 1/4	-10.5
O	REYNCLOS C REYNOLO	17- 20	19	+ 1/4	+1.3
O	SCIEN7IFIC COMPUTERS	1- 4	4 1/8	+ 1/4	+6.4
O	TYMSHARE INC	14- 23	20 1/8	+1 5/8	+8.7
A	URS SYSTEMS	4- 5	4 1/2	+ 1/2	+12.5
N	WYLY CORP	1- 2	7/8	+	+7.6

PERIPHERALS C SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	AOORESSOGRAPH-MULT	10- 15	14 1/8	+ 5/8	+4.6
O	AOVANCEO MEMORY SYS	7- 9	6 7/8	0	0.0
N	AMREX CORP	8- 11	10	0	0.0
O	ANCERSON JACOBSGN	3- 5	3 3/4	+ 3/8	+11.1
N	APPLIEO OIG OATA SYS	10- 20	14 1/4	+ 3/4	+5.5
O	BEEHIVE INT'L	8- 12	9 7/8	+ 3/8	+3.9
A	BOLT,BERANEK C NEW	7- 9	8 5/8	0	0.0
N	BUNKER-RAMO	6- 12	10 7/8	+ 1/2	+4.8
A	CALCCMP	3- 5	3	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3 3/6	+ 1/8	+3.R
N	CENTRONICS OATA COMP	22- 30	22 7/8	-4 3/8	-16.0
C	CCGNITRONICS	1- 1	3/4	+	+9.0
O	CCMPUTER COMMUN.	5- 8	6 7/8	- 1/8	-1.7
O	CCMPUTER CCNSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2 7/8	- 1/4	-8.0
O	COMPUTER 7RANSCEIVER	1- 1	1 3/8	0	0.0
C	CCMTEN	9- 13	10 1/4	- 1/4	-2.3
A	CCNRAC CORP	19- 28	21	0	0.0
O	OATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7	- 1/8	-1.7
A	OATA PROOUCTS CORR	9- 16	15	+ 1/8	+0.8
O	OATA TECHNOLOGY	3- 4	4	0	0.0
O	OATUM INC	1- 2	2	- 1/8	-5.8
O	OECISION DATA COMPUT	2- 3	2 1/4	+ 1/8	+5.8
O	OELTA OATA SYSTEMS	1- 1	3/8	0	0.0
A	COCUMATION INC	6- 9	7	+ 1/8	+1.8
O	OATARAM CORP	2- 11	10 1/4	- 1/2	-4.6
N	ELECTRONIC M & M	4- 5	4 1/8	+ 1/4	+6.4
O	FABRI-TEK	1- 2	1 1/4	+	+5.2
O	GENERAL COMRUTER SYS	0- 2	1	- 1/8	-11.1
N	HAZELTINE CORP	8- 12	8 3/8	- 1/8	-1.4
N	HARRIS CORP	28- 39	38	+ 1/2	+1.3
A	INCOTERM CORP	10- 15	13 3/4	+ 3/4	+5.7
O	INFOREX INC	4- 7	4 7/8	+ 1/2	+11.4
O	INFORMA7ICN INTL INC	9- 14	11	0	0.0
O	INTEL CORP	38- 57	48	-1 1/2	-3.0
A	LUNOY ELECTRONICS	3- 6	4 1/2	+ 1/4	+5.8
O	MSI OATA CORP	6- 13	12	- 1/2	-4.0
N	MOHAWK OATA SCI	5- 8	5 7/8	0	0.0
O	PENRIL CORP	2- 5	4 1/8	0	0.0
A	PERTEC CORP	7- 9	8 1/2	+ 1/4	+3.0
A	PCTTER INSTRUMEN7	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	OUANTOR CORP	4- 5	3 3/4	0	0.0
C	RECCGNI7ION EOUIP	6- 10	7 1/2	- 1/4	-3.2
O	SCAN CATA	1- 2	1 1/8	-	-5.3
O	S7ORAGE TECHNOLCGY	10- 18	16 5/8	- 7/8	-5.0
O	T BAR INC	7- 13	12 3/4	0	0.0
O	7ALLY CORP.	4- 6	4 1/8	- 1/8	-2.9
A	TEC INC	7- 10	7 1/4	- 1/4	-3.3
N	TEKTRONIX INC	29- 38	37 1/4	+ 1/8	+0.3
N	7ELEX	2- 3	2 1/2	- 1/8	-4.7
O	WILTEK INC	1- 1	3/4	0	0.0

SUPRLIES C ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRCOS	6- 6	6 1/4	0	0.0
O	BALTIMORE BUS FORMS	2- 4	1 1/2	- 1/8	-7.6
A	BARRY WRIGHT	10- 14	13 1/8	0	0.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	OUPLEX PRODUCTS INC	14- 19	17 3/8	+ 1/4	+1.4
N	ENNIS BUS. FOPMS	6- 7	6 1/8	+ 1/8	+2.0
C	GRAHAM MAGNETICS	11- 17	17	0	0.0
C	GRAPHIC CONTROLS	14- 18	14 1/4	0	0.0
N	3M COMPANY	48- 56	50 3/8	+ 3/8	+0.7
O	MCORE CORP LTC	26- 37	26 1/4	- 1/4	-0.9
N	NASHUA CORP	16- 28	19	-8 3/8	-30.5
C	STANOARD REGISTER	18- 25	15 3/4	0	0.0
O	TAB PROOUCTS CO	13- 19	15 3/4	+ 3/4	+5.0
N	UARCC	19- 22	19 7/8	+ 1/8	+0.6
A	WABASH MAGNETICS	10- 15	12	+ 1/2	+4.4
N	WALLACE BUS FORMS	17- 21	18 1/6	- 1/8	-0.6

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NEWSPAPER

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CW Photos by J. Beeler

The exhibitors were ready and waiting as members of DPMA gathered in Washington, D.C., last week for their annual fest. Coverage of Info/-Expo '77 begins on Page 8.

New IBM Processors Flush Out Itel AS/6, But Amdahl Stands Pat

By Frank Vaughan
CW Staff

SAN FRANCISCO — Itel Corp. reacted to the recent IBM 3032 and 3031 announcement with a card it had tucked up its sleeve.

The Itel AS/6 system, introduced within six hours of the IBM announcement, has been in the works for some time and was even accidentally advertised by the firm this summer [CW, July 18].

Itel is promising first customer shipments in March, the same time deliveries of the IBM 3032 are slated to begin.

Itel is using its AS/6 to directly challenge the 3032. The unit is based on Itel's 7032 processor, which the firm claimed is 10% to 25% more powerful than the 3032.

The air-cooled AS/6 is functionally compatible with IBM 360, 370 and 3032 software, Itel said, noting processor operations are controlled through microprograms residing in reloadable control storage.

The main storage of the AS-6 is based on 4K bit/chip technology that gives 100 nsec access times on the chip level. Bus-level access times were not available.

(Continued on Page 6)

By E. Drake Lundell Jr.
CW Staff

SUNNYVALE, Calif. — Like a poker player reviewing a straight flush, Amdahl Corp. stood pat when IBM announced its 3031 and 3032 processors.

"The company has evaluated the IBM announcements and concluded the new products are replacements for the mid-range of the 370 line," Amdahl Vice-Chairman Eugene R. White said. "We see no reason to modify the existing 470 line product plan."

Amdahl has reason to be satisfied with its hand even if IBM is raising the stakes in the game (see chart on Page 4). The Amdahl 470V/6-II and V/7 clearly hold the high ground of the IBM-compatible CPU line, with both offering users more CPU power than any of the IBM 30 series entries [CW, Oct. 10].

The V/6-II is slightly more powerful than IBM's top entry, the 3033, but totes a price tag that is $105,000 less than the IBM entry.

The V/7, however, is almost 60% more powerful than the 3033 at only an additional $95,000.

While the V/6 shares the 3033's memory limitation of 8M bytes, the V/7 allows users to double that with up to 16M bytes on a system.

However, at the lower end of the line, Amdahl's V/5 does not compare so favorably with the new 3032, since it offers slightly less CPU power for a slightly higher cost.

In competition with the IBM 3031, though, the V/5 offers almost 125% the power of the IBM unit for slightly less than a 100% increase in price.

The V/5 has another advantage over its IBM counterparts — it can be field-

(Continued on Page 4)

NCIC Audit, Expansion Pending

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Justice Department and its Federal Bureau of Investigation have officially acknowledged flaws in the National Crime Information Center (NCIC), but at the same time showed their determination to expand that system further with some type of message-switching arrangement.

At hearings here recently, representatives of both organizations told a congressional subcommittee they would welcome an on-site independent audit of the NCIC to satisfy critics such as the Scientists Institute for Public Information (Sipi) which contended that without regular auditing, security and privacy safeguards cannot be assured [CW, Sept. 12].

At the same time, Deputy Attorney General Peter F. Flaherty addressed the FBI's request to end or improve its participation in the Computerized Criminal History (CCH) portion of NCIC by directing the bureau to develop a "comprehensive blueprint for decentralizing the CCH program to participating states."

Flaherty also reiterated the Justice Department's request that the FBI be permitted to improve "the communications control capabilities needed to service all NCIC system inquiries." This request came in a letter to Rep. Don Edwards (D-Calif.), who chairs the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, the unit that conducted the hearings.

The letter, which Edwards made public at the hearing, hastened to assure that while such equipment would have the inherent capability to perform message switching, the FBI will not employ this capability until the Attorney General and Congress approve the CCH decentralization.

The hearings focused on a preliminary Sipi report that contended the NCIC has not proved its worth as a crime-fighting tool despite 10 years of operation.

In that report, the Sipi Task Force on Science and Technology sharply criticized the lack of any regular auditing of NCIC data and procedures by an independent auditing authority.

"We shall attempt to negotiate an agreement with the General Accounting Office that will result in on-site systems auditing of NCIC operations, commencing as soon as possible, for

(Continued on Page 6)

Wang, HIS Extend Options

Systems Bow

By Esther Surden
CW Staff

NEW YORK — Wang Laboratories, Inc. introduced two large-scale minicomputers last week, designed for business users with sophisticated processing needs.

Based on the 2200VS processor, also announced last week, the WCS/60 and WCS/80 systems offer virtual memory capability and can accommodate up to 512K bytes of real memory. They also feature a 32-bit word length and are programmable in Ansi 74 Cobol, RPG-

(Continued on Page 5)

Upgrade Offered

By Esther Surden
CW Staff

PHOENIX — Honeywell Information Systems, Inc. has announced a hardware/software package that reportedly allows its Series 6000 users to obtain "the functionality" of the larger Level 66 mainframes without trading in their systems.

The company also brought out enhancements for the models 6025 and 6040 that increase to 512K words the amount of memory these systems can accommodate. The Model 6060 now

(Continued on Page 7)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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'Regulator' Patent Now Possible

High Court Refuses Patent Review

By Nancy French
CW Staff

WASHINGTON, D.C. — The Supreme Court recently refused to review a case brought by the U.S. Patent Office against a software inventor who has sought a patent for a specialized computer program for nearly five years. The high court's decision cleared the last obstacle in the way of a patent award for Glen Chatfield's "Regulator" program [CW, Dec. 13].

Regulator was designed to monitor and modify the flow of user programs in a multiprogramming environment through dynamic changes in program priority assignments.

In appealing the case to the Supreme Court, the Patent Office sought review of a decision last November in which the U.S. Court of Customs and Patent Appeals (CCPA) ruled the Regulator program, invented by Chatfield and marketed by Duquesne Systems, Inc. as part of its Quantitative Computer Management package, is eligible for protection as an invention under existing law.

Chatfield is president and part owner of Duquesne, a seven-member, Pittsburgh-based consulting firm with half a million dollars in annual revenues.

The Supreme Court denied the Patent Office's petition for a writ of certiorari on a technicality — the U.S. Solicitor General, the Patent Office's legal counsel, waited too long after the CCPA decision to file.

In his brief on behalf of the Patent Office, the Solicitor General argued the CCPA should have applied the precedent set in the Benson-Tabbot case in 1972 to the Chatfield patent claims, according to David Hanson of Webb, Burden, Robinson & Webb, Chatfield's counsel.

The CCPA, however, apparently saw a distinction between Benson-Tabbot and Chatfield. In Benson-Tabbot, the inventor was attempting to patent a method for converting one system of numbers to another, BCD to binary. This abstract mathematical method could be executed on any machine — and even with pencil and paper — for any purpose, Chatfield explained.

Chatfield's method, on the other hand, is a technique for optimizing the flow of jobs through a multiprogrammed computer. The CCPA saw this as "a unique method for improving the efficiency of a system of electromechanical machines, i.e. a computer system," according to Hanson.

The CCPA concluded that Chatfield's claimed method did not preempt mathematical formulas or algorithms even though some of his dependent claims recited algorithms, Hanson added.

The Computer and Business Equipment Manufacturers Association (Cbema) filed an amicus curiae brief in the case siding with the Commissioner of Patents and emphasizing the extremely important economic implications the case has on the entire business and technical community, according to Oliver Smoot, Cbema vice-president.

Reached after the Supreme Court made its decision, Chatfield said he interpreted the court's refusal to review the case as tacit agreement with the CCPA position, although there's no way to actually confirm that.

The Supreme Court's action leaves many other inventors like Chatfield in the position of fighting similar cases over again, Smoot said.

> *"The Supreme Court's action leaves many other inventors like Chatfield in the position of fighting similar cases over again."*

Perhaps the ultimate solution is a better law, Chatfield said.

The copyright — the program protection alternative currently favored by the National Commission on New Technological Uses of Copyrighted Works (Contu) is "very weak protection," according to Chatfield.

The trade secret approach, on the other hand, creates difficulties for the software vendor, because computer software cannot be sold without distributing source code — which amounts to complete disclosure. This requires complicated confidentiality agreements with customers, he explained.

A patent is the best approach and is the opposite of a trade secret, Chatfield said: It requires full disclosure and gives the inventor an exclusive right to use the idea for 17 years.

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IBM, Amdahl, Itel: How They Stack Up Now

Model / Characteristics	IBM 370/158-3	IBM 3031	IBM 370/168-3	Amdahl 470V/5	IBM 3032	Itel AS/6	IBM 3033	Amdahl 470V/6-II	Amdahl 470V/7
Relative CPU Power[1]	52	52	109	120	135	150	180	184	294
Purchase Price[2] (Memory in Bytes)	2,001,100 (6M)	1,455,000 (6M)	3,103,210 (6M)	2,870,000 (6M)	2,368,000 (6M)	2,360,000 (6M)	3,605,000 (6M)	3,500,000 (6M)	3,700,000 (6M)
Purchase Price[3] (No. of Channels)	2,052,865 (6)	1,455,000 (12)	4,388,460 (12)	2,870,000 (8)	2,728,000 (12)	2,660,000 (12)	3,605,000 (12)	3,500,000 (16)	3,700,000 (12)
Price/Mo[4] (Four-Year Lease)	59,600	39,310	122,629	78,925	67,470	Not Available	77,480	96,250	Not Available
Maintenance/Mo[5]	3,234	3,690	9,466	9,700	7,675	Not Available	8,320	10,200	10,200
Memory Size in Bytes (Minimum – Maximum)	512K – 6M	2M – 6M	1M – 8M	2M – 6M	2M – 6M	2M – 16M	4M – 8M	4M – 8M	4M – 16M
Memory Cycle Time (Nsec)	620 – 1,035	345 – 805	320	300	320	Not Available	290 – 464	300	280
Machine Cycle Time (Nsec)	115	115	80	32.5	80	72	58	32.5	28.5
Channels (Minimum – Maximum)	3 Standard – 6	6 Standard	0 – 12	8 Standard	6 Standard – 12	6 Standard – 16	12 Standard – 16	16 Standard	12 Standard – 16
Price/Channel	4th – 16,160 5th – 15,040 6th – 7,565	Built-In	Note 6	Built-In	360,000/ 6 channels	50,000	320,000/ 4 channels[7]	Built-In	150,000/ 4 channels
Multiprocessor Configurations?	Yes	No	Yes	No	No	No	No	No	No
Buffer Size	16K	32K	32K	16K	32K	64K	64K	32K	32K

NOTES CW Chart

1. International Data Corp. estimates based on 360/50 = 10 for all but IBM 3031, 3032, 3033 and Itel AS/6, which are CW estimates.
2. Includes CPU, power supply, operator's console and 6M-byte memory. The Amdahl systems include standard channels as do IBM 370/158-3, 3032 and 3033. The 370/168-3 includes extended channel feature (3855) but no channels.
3. All of 2 with channels added.
4. Lease rate based on purchase price in 3.
5. IBM maintenance is minimum monthly, 10 hour/day, five day/week. Amdahl maintenance is 24 hour/day, seven day/week.
6. The 2870 byte-multiplexer channel costs $117,900. The 2880 block multiplexer contains two channels for $174,500.
7. Users must add four channels; choice of four block multiplexers or three block multiplexers and one byte multiplexer.

Amdahl Unfazed By IBM Debuts

(Continued from Page 1)

upgraded to a V/6 for a purchase price of $780,000. The IBM machines have to be completely replaced.

Furthermore, the unit is air-cooled, as are all of the Amdahl processors, while the IBM 3032 is water-cooled.

Even though Amdahl did not react to the latest IBM moves at this time, industry sources indicated further pricing actions could come from IBM either late this year or next spring.

These prognosticators noted the price of memory is holding steady at around $110,000 per megabyte.

At the same time, they indicated that present industry performance shows memory price reductions should be in the offing; these would probably decrease memory to $85,000.

When that happens in the IBM line, the industry analysts predicted, Amdahl will probably adjust its memory prices to remain competitive.

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Wang Large-Scale Minis In Range of PDP-11/70

(Continued from Page 1)

II and Basic.

Designed to suit the needs of users in medium-sized companies, remote locations of larger, centralized companies and present Wang users who are reaching the limits of their systems, the WCS/60 and WCS/80 are only minimally compatible with the company's less powerful systems, a spokesman said.

Users wishing to upgrade to the systems can transport some peripherals to the larger units, but the processors are entirely different. And although the Basic on the smaller Wang systems is similar to that offered on the WCS/60 and WCS/80, programs written on the smaller systems must undergo "some conversion," the firm acknowledged.

The company described the system as covering the IBM 34, Digital Equipment Corp. PDP-11/70 and Data General Corp. Eclipse range.

CPU Features

The 2200VS CPU includes a microprogrammed instruction set with more than 170 instructions, many of which are the same instructions found on the IBM 360, Wang said. The CPU contains 16 32-bit general-purpose registers, four 640-bit floating-point registers and eight 32-bit control registers.

Input/ouput is handled through independent I/O processors (IOPs). Each IOP includes its own microprocessor, allowing the CPU to continue processing data internally while I/O operations take place.

Wang uses semiconductor memory in its 2200VS-based systems. Memory features a 660-nsec average access time for two bytes and includes a six-bit error-correction code.

An automatic data compacting feature allows users to compress records before storing them on disk, the spokesman explained.

Characters that are repeated three or more times in sequence are stored as a single character and a repetition count. This compression is routinely performed on "print files" and can be used with "data files" when specified at the time the file is created, he noted.

Memory Expandability

The WCS/60 can handle from 64K bytes to 256K bytes of memory, while the WCS/80 is expandable from 256K bytes to 512K bytes. The WCS/60's disk storage capacity is expandable from 10M bytes to 150M bytes. The larger system accommodates a minimum of 150M bytes and can handle up to 2.3G bytes on-line using eight 288M-byte disk drives, the firm said.

Multiple CRTs can be attached to both systems with the WCS/60 accommodating up to 16 CRTs and the WCS/80, up to 23.

CRTs include a 24-line, 80 char./line screen and keyboard. One CRT would be designated as a system console to control printer allocation and other tasks including background processing of jobs that require batch operations. The jobs are run from a queue at the console, the company noted.

A communication IOP allows the systems to communicate with remote mainframes. IBM 2780/3780 emulation, 3270 emulation, remote Wang 2246P workstation and Hasp bisynchronous protocols are also accommodated.

System Prices

A medium-sized WCS/60 system with 192K bytes of memory, six workstations, two 10M-byte disk drives, diskette and a 240 line/min printer costs $84,800.

A medium-sized WCS/80 system with 384K bytes of memory, 10 workstations, three 75M-byte disk drives, a floppy disk and a 600 line/-min printer costs $172,000. The systems will be available in December, Wang said from One Industrial Ave., Lowell, Mass. 01851.

Multiprocessing, multiprogramming and multiple workstations are features of the WCS-80 supermini pictured above. The 32-bit system was designed for business DP use.

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FBI Seeks Expanded NCIC, Agrees to Audit

(Continued from Page 1)

the purpose of ensuring there are adequate security and privacy safeguards for both current and historical data," Flaherty's letter said.

The computer scientists who visited the NCIC operation in Washington and who appeared at the congressional hearing applauded this attitude by Justice and the FBI. Edwards had received Flaherty's letter on Sept. 29, the same day on which the hearing was held.

Daniel D. McCracken, who chaired the Sipi task force and who is vice-president of the Association for Computing Machinery, tried to put the preliminary report into perspective by stating it was not "an overall evaluation of the effectiveness of NCIC."

Rather, the report's intent was to suggest "that there are some ... important questions that have not been addressed, to the best of our knowledge," McCracken said.

Among those questions are: what are the performance statistics of NCIC with regard to how often, in response to an inquiry, state law enforcement officials receive information about a missing person or a stolen article from the system? And has the NCIC had an impact on the nation's crime rate?

Focus on CCH

Scientists Myron Uretsky, director of the Management Decision Laboratory at the New York University Graduate School of Business Administration, and Joseph Weizenbaum, professor of computer science at MIT, focused their comments to the subcommittee on the CCH portion of NCIC.

"Even though a limited number of states have thus far elected to supply data to this system, the superstructure has now been put into place for the establishment of a nationwide police file on residents in this country," Uretsky said.

"It is thus imperative that we use the present opportunity to reexamine the experience with NCIC to identify present and potential future problems that must be overcome if we are to provide an adequate balance between the operating needs of police agencies and the need to guarantee personal freedoms," he added.

Weizenbaum fears the inadvertent creation of "a national computer data bank" and suggested to the subcommittee that NCIC and other efforts could become such a data bank, regardless of whether they are decentralized.

Any information system should be designed to be auditable in addition to being periodically audited, Weizenbaum said.

The Justice Department and FBI's desire for an NCIC message switching capability troubled the MIT scientist considerably. "I would consider the existence of a system with the capabilities that are envisioned here — the mere existence of such a system, in whomever's hands it may be — to be a very large threat to the civil liberties of the people of the U.S.," he stated.

If the Justice Department and Congress do permit the FBI to develop limited NCIC message switching, the states and not the bureau would control the dissemination of CCH data, the FBI's response to Sipi's preliminary report said.

"In an 'electronic context,' we do not believe that it can properly be said that 'the FBI would control the flow of ever-increasing amounts of criminal justice information throughout the country.' We feel that this could no more be said of the FBI than, say, AT&T and Western Union," the FBI stated, arguing that its equipment would act merely as a conduit and automatic switcher without reference to the contents of CCH transactions.

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WANG

AS/6 Waiting in the Wings

(Continued from Page 1)

Itel is expected to announce a 7031 processor for the AS/5 very shortly — a move that will make that system competitive with IBM's newly announced 3031 processor. First shipments of the 3031 will probably begin in the fourth quarter of 1978.

The AS/6 with the 7032 CPU and operator console, two I/O processors with a total of six channels and 2M bytes of main memory costs $1.96 million compared with $1.9 million for a 2M-byte 3032.

The system can be upgraded to 16M bytes of storage and up to 16 channels. No additional I/O processors are needed for the full channel upgrade, a spokesman noted.

Itel has not announced any maintenance prices on the system, but the spokesman said maintenance will be equal to or less than equivalent maintenance charges on the IBM 370/168-3.

There is no multiprocessor configuration at this time and the spokesman refused to comment on future lease plans.

N.Y. Exempts T/S From Taxes

ALBANY, N.Y. — The New York State Tax Commission has voted to treat time-sharing services as informational services and tax them accordingly, according to Thomas H. Lynch, tax commissioner.

This means that if a manual payroll procedure was not taxed because it was an informational service, payroll on a time-sharing basis also will not be taxed, Lynch indicated.

The tax commission will examine the underlying nature of the transaction to determine if it is taxable and will not get involved with details such as where the terminal is located and how the system is accessed, he said.

Lynch is preparing to redraft regulations on time-sharing, which will be presented to the industry for review. The changes will be effective as of the date issue, which should be within a couple of months after they are sent to the New York State Legislature.

The commission set another meeting for Nov. 1. Meanwhile, several task groups are preparing reports.

Corrections

Some prices in the chart on Page 1 last week [CW, Oct. 10] were incorrect. The purchase price of an 370/168 with CPU, power supply, operator's console, memory and six optional channels is $3,554,920; on a four-year lease it costs $95,880/mo.

The prices of additional channels for the 370/158 and 158-3 are $16,160 for the fourth channel, $15,040 for the fifth and $7,565 for the sixth.

In addition, the relative power of an IBM 3033 is 185 if a 360/50=10.

Further, Itel Corp. reported its AS/6 processor is three to four times as powerful as its AS/5-3.

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FBI Questions Reevaluation of Need for NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Federal Bureau of Investigation has responded to recent criticism of its National Crime Information Center (NCIC) in a statement that compares reevaluating the need for NCIC with reevaluating the need for police cars and two-way radios.

Prepared at the request of Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, the report addressed such subjects as system auditing, "hit" ratios and uptime.

The NCIC is audited, the FBI statement said, although not by an independent organization. However, "the FBI does not conduct unannounced audits [of state and local law enforcement participation in NCIC], as this would be an infringement on the sovereignty of the states."

The FBI stressed that its system is a cooperative one. "We believe that our friendly relationship [with state and local law enforcement agencies] helps promote the cooperative spirit needed to admit and remedy problems," the response said.

While it conceded that an in-depth evaluation of the system "would be informative and would help document the NCIC's many benefits," the bureau added that "it is questionable that such an evaluation is needed.

"This is because there has been built up over the 10 years of its existence a vast body of empirical knowledge regarding its value. One need only ask any member of law enforcement about NCIC to learn of its need and value," the FBI wrote.

"We do not believe anyone today would ask for an in-depth evaluation on the need for two-way radios in police cars; or, for that matter, on the need for police cars," the bureau added.

'Conservative Estimate'

Suggesting that the nearly 260,000 transactions that NCIC handles daily should be evidence of the system's utility, the FBI admitted that its belief that there are 1,000 "hits" a day represents "a very conservative estimate on the part of the FBI as to the NCIC hit rate."

The FBI is actually not in a position to know which of the positive responses generated by the system are true hits, because only the inquiring agency can identify a true hit by comparing NCIC information with the facts that prompted the inquiry, the response said.

The bureau suggested that the task force's criticism of the NCIC's 94% uptime as an unacceptable record in most commercial enterprises was a comparison of "apples and oranges."

The NCIC operates in a law enforcement environment, 24 hours a day, seven days a week, while most banks and insurance companies operate in an on-line environment 16 hours or less per day," the FBI said.

The bureau added that the system is futher constrained by having to interact with a multiplicity of types of computers and terminals provided by a diversity of manufacturers.

Additions to the NCIC communications capability would help minimize downtime, the FBI statement said.

The House Subcommittee on Civil and Constitutional Rights plans to hold further hearings on the NCIC this fall to obtain more details.

HIS Enhances Series 6000

(Continued from Page 1)

can handle up to 1M words of storage, up from its previous limit of 512K words, HIS said.

The Level 66 upgrade option is available to users of the 6025, 6040 and 6060 Extended Instruction Set models in the Series 6000 line. While enhancement of these systems means modifying and/or partially replacing the 6000 processors, systems controllers, I/O multiplexers and memory, upgrading can be done at the user's site, according to a spokesman.

After the upgrade, HIS said, series 6000 users will be able to connect any Level 66 unit record equipment, magnetic media or front-end network processors and use Level 66 software. Those users with 6025 and 6040 systems can then upgrade to multiprocessor configurations if they wish, the firm noted.

"Due to wide variations in the Series 6000 customer configurations, pricing for the upgrade package will be determined on an individual site basis," the spokesman said, "and will range from $250,000 to $1 million."

With the memory enhancements, the 6025, which formerly could accommodate 128K words, can be expanded to 512K words for $380,184 or $9,052/mo on a five-year plan. The 6040, which previously had a ceiling of 256K words, can now handle 512K words for an additional $5,892/mo on the five-year plan or $247,464.

The cost to extend the 6060 from 512K to 1M words is $9,404/mo or $325,168.

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Even 'Squealers' Deemed Vital to DP Planning

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — Planning is essential to data processing if a project is to meet its goals, Capt. Stephen R. Ruth of the U.S. Navy told a Data Processing Management Association group at Info/Expo '77 here last week.

The routine elements of a good plan are goals, objectives, pizzazz, clarity and management support, he said.

The project planner must be aware of the interactions of all decisions, because every action taken will have an effect on something else.

There are several roles involved in a plan, Ruth said. There is the leader, who doesn't really lead but instead sets up conditions that will induce people to do what he wants. Next, there is the power center — which is rarely the leader — that actually leads people to achieve the goals the titular leader wants achieved.

Then there are the workers, the recorder — who keeps track of everything — and, most importantly, according to Ruth, the corporate squealer.

The squealer is someone institutionally involved in direct communication with the boss, Ruth explained. Such a person can thus rapidly communicate when a project isn't working out.

CW at Info/Expo

A squealer is needed because most people working on a project they planned suffer from "cognitive dissonance"; they refuse to see what they don't want to see. Consequently, they won't admit to top management that a goal they set cannot be met. That is the job of the squealer, Ruth said.

It is vital in any plan to have a certain amount of accountability tension — that is, "when something goes wrong, you know exactly whom to fire," Ruth quoted. It is desirable to have commitment, a merit/demerit structure for rewarding or punishing employees and an isolation structure to keep the project team away from other job pressures.

It is useful to have team spirit and enthusiasm, but Ruth pointed out that the New York Yankees had very little of either this year, and they still won the American League pennant.

To measure the effectiveness of a project, one can count the number of elapsed days, the skills retained, the number of checkpoints passed successfully, the degree of user satisfaction and the amount of management involvement, Ruth said.

It is especially important to remember "Ruth's rule," he said: If you learn the bad news early, pass it on.

Variety of Personal Shortcomings Seen Bases for Manager Failure

By Jeffrey Beeler
CW Staff

WASHINGTON, D.C. — Some DP managers are habitual loud mouths who meddle incessantly in other people's business and pretentiously display their knowledge.

Others affect a cocky and abrasive manner that their colleagues find insulting and obnoxious. And still others lack coolness under fire and go to pieces at the first sign of trouble in their departments.

If you know or work with DP managers who fit these descriptions, take heart. The troublemakers will probably be out of your hair soon because they embody at least some of the characteristics that typically lead to failure in the DP management field, according to Jim Towsen, general services manager of the Statesman Group in Harrisburg, Pa.

Speaking on the subject of "why managers fail," Towsen told a crowd of about 250 at Info/Expo '77 here that a DP manager's downfall can spring from a variety of personal shortcomings.

Some of the most common of these defects include a failure to cultivate a profesional demeanor, refusal to conform to corporate regulations, inadequacies as a planner and organizer, and an inability to accept other individuals' points of view.

Another prime reason for failure among DP managers is lack of tact in interpersonal relationships, Towsen said.

Some managers, he explained, maintain a hypocritical attitude toward their colleagues. Among their superiors, they spare no effort to curry favor and portray themselves in as favorable a light as possible.

But among their subordinates, they are overbearing and tyrannical and seldom miss an opportunity to demonstrate their superior status in the corporate hierarchy.

Towsen also blamed alcohol and drug abuse for the undoing of many DP managers.

To guard against these personal pitfalls, Towsen urged DP managers to encourage their underlings to accept additional executive duties and responsibilities.

Job Threats

Too many managers, he explained, regard their subordinates as job threats and thus present them from advancing professionally.

Towsen also advised DP managers to avoid showing favoritism in making job assignments and to keep up as much as possible with the latest technical developments in their field.

On the subject of utilizing time efficiently, Towsen offered these suggestions:

- Prepare a checklist of important tasks to be performed and then stick to it.
- Use a dictating machine to record all important memos.
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Await Government Go-Ahead

CDC, Soviets Restart 'Recursive' CPU Project

MINNEAPOLIS — Control Data Corp. and the Physical and Technical Institute of the Soviet Academy of Science in Leningrad are contemplating joint work on a "recursive" computer.

The work would involve proving the feasibililty of a machine that can process blocks of data in any order depending on what part of the system is available at any given moment, according to CDC.

In contrast, conventional computers must process data in a set order determined by the computer program. If proven feasible, a recursive computer should be able to process data much more rapidly than a conventional computer of equivalent size, CDC said.

For example, according to Soviet designers, a recursive system containing 64 interconnected identical microprocessors should be able to do 10 million operation/sec, making the concept ideal for real-time control of industrial processes.

Leningrad Talks

CDC executive vice-president Robert B. Schmidt indicated any further progress of the joint venture would be made only after obtaining approval from the U.S. government.

Schmidt, who participated in the talks in Leningrad, said "So far we have simply discussed the possibility of small-scale joint investigation to prove the feasibility of this unique concept."

One of Two Plans

The concept of a recursive computer was one of two that CDC and the USSR agreed to investigate under a 1973 agreement. CDC dropped discussion of a large-scale machine based on a rearrangeable structure because of the U.S. government's reluctance to grant approval, CDC said.

The concept of proving the feasibility of a recursive computer was tabled shortly thereafter. However, interest was renewed this March as a result of new progress by scientists at the Leningrad academy, CDC said.

The Soviets have indicated they expect the cost of such a machine to be less than one fourth that of a conventional machine.

According to Schmidt, the Soviet scientists have been working on this concept for more than 10 years. Two laboratory models of the computer have been built, with the remainder of the system simulated by a Soviet Besm-6 computer. Additional work was first aimed at comparing cost and performance with that of a conventional machine.

German System Leads Officials To 4,000 Spies

Special to CW

BONN, W. Germany — Computers operating from a bunker in the mountains near here have succeeded in uncovering 4,000 East German spies, according to the head of West Germany's Office for the Protection of the Constitution.

According to a news report, personal details and behavior information on individuals are entered into a computer which analyzes suspicious activities. For example, data that reveals a person has been often married and divorced, has used false names or has had questionable jobs may lead investigators to East German agents and terrorists.

So far only one embarrassing error has been revealed. That is about Prof. Klaus Traube, a nuclear scientist whose association with leftist students cost him his job. A full examination of the facts cleared Prof. Traube of all suspicions of disloyalty.

The youngest spy the computer has discovered is a 17-year-old school boy.

The government did not mention any concern about possible invasions of privacy resulting from the system's use.

Finance Systems Topic of Meets

STAMFORD, Conn. — Real Decisions Corp. (RDC) will present a one-day seminar on criteria for choosing an interactive financial planning system. The seminar will be held on Nov. 4, in New York City, on Nov. 16, in Chicago and on Nov. 18 in San Francisco.

The seminar is aimed at providing users and potential users of such planning systems with the tools needed to select the right system for their particular needs.

Speakers will include John M. Lewis and Robert J. Bergstrom, principals and cofounders of Real Decisions Corp., and Hillel Segal, president of the Association of Time-Sharing Users (Atsu).

The cost of the seminar is $185 for the first registrant from each company and $115 for each additional registration. For more information, contact Real Decisions Corp., 870 High Ridge Road, Stamford, Conn. 06905.

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DP Managers Still in Adolescence: Withington

By Catherine Arnst
CW Staff

CW at Info/Expo

WASHINGTON, D.C. — Data processing is a young science and DP managers are still in their adolescence — that is, immature, arrogant and often wrongheaded.

That was the message delivered by Frederic G. Withington, an Arthur D. Little; Inc, consultant, at Info/-Expo '77 sponsored by the Data Processing Management Association here last week.

Although Withington said one must "have pity on DP managers, whose job has never been easy," he qualified that sentiment by adding that "we've partly brought these problems on ourselves . . . by acting like adolescents."

DP managers often have all the classic faults of the typical adolescent; he said: They are know-it-alls, simplistic, self-centered, too ambitious, incommunicative and arrogant.

In addition, when they become excited, they are overly energetic and unwilling to wait for others.

Managers must start to grow up if they are to cope with the rapid changes through which DP will be going in the future, because "things will apparently get worse," Withington said.

How do DP managers grow up? Withington offered several suggestions:

They must accept change as the essence of the DP manager's job; give up trying to develop utopian systems; let users do some of the applications; pilot test new systems and then be prepared to redo them if the test fails.

In addition, they should work in groups, not as individuals; change the organizational structure of the DP department frequently; and conserve themselves by promising and delivering less.

There may be outcries that the boss wants the big promises, but then again, "maybe your boss is getting tired of adolescents running around the place," Withington concluded.

Hayden Offering Updated Version Of DP Dictionary

ROCHELLE PARK, N.J. — The Hayden Book Co. has announced the publication of the revised second edition of its *Standard Dictionary of Computers and Information Processing*. Written by Martin H. Weik, the dictionary is described as a source/reference book, featuring explanations, examples and illustrations for over 12,500 hardware and software items.

Unlike other dictionaries, it cross-references the terms to other closely related concepts, and all its definitions are consistent with the lastest professional usage approved by technical society, government, national and international standards bodies.

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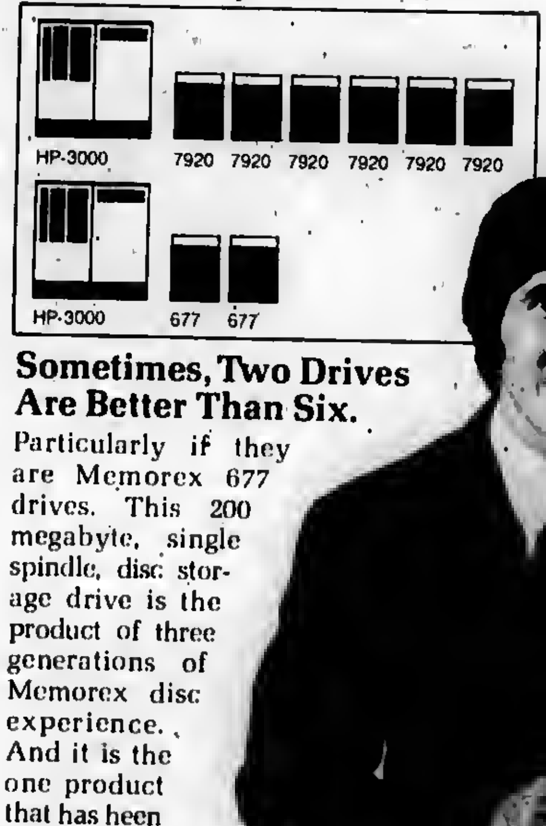

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They'll Be First to Take Heat

Managers Warned DDP Could Spell Trouble

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — The proliferation of distributed data processing (DDP) systems in the 1980s holds great promise for the computer industry, but it also poses grave risks for DP managers, Clarence W. Spangle said in his keynote address at Info/Expo '77 here.

The Honeywell Information Systems president predicted that DDP will give line managers an additional supervisory tool and provide top management with a valuable source of previously unavailable summary reports.

It will also make possible a number of important applications that today are technologically impractical, he said at the conference sponsored by the Data Processing Management Association.

But DDP will also extend computerization to nearly every area of corporate operations, and that development could spell trouble for an unwary DP manager, Spangle warned.

As the role of computers in the business environment expands during the next few years, DP managers will increasingly find themselves blamed when problems of corporate productivity and organization arise, Spangle explained.

Nearly every department of a company will depend in some degree on computers, and when the vital machines break down, the DP manager will be the first to take the heat, he said.

As a result, DP managers will have to widen their scope of interest beyond their own traditional specialty and increasingly assume the role of an executive on an equal footing with other top corporate officers, he added.

Among its other impacts, the rise of DDP will force DP managers to shoulder increased responsibility for the overall productivity of information systems and to spend more time than ever before planning and coordinating new systems. In fact, at some companies DP managers may even become "the guardians of all communications assets," Spangle said.

Distributed processing will also give rise to the need for increased standardization of communcations protocols and force users to cut the cost of moving data, he added.

Origin of DDP

Spangle traced the origin of DDP systems to the emergence 25 years ago of centralized DP activities. The next step in the development of the phenomenon came with the proliferation of computer hardware in discrete and connected systems.

Two influences aided the development process, Spangle said: the expanding variety of available hardware and a hundred-fold drop in the cost of semiconductor memory.

CW at Info/Expo

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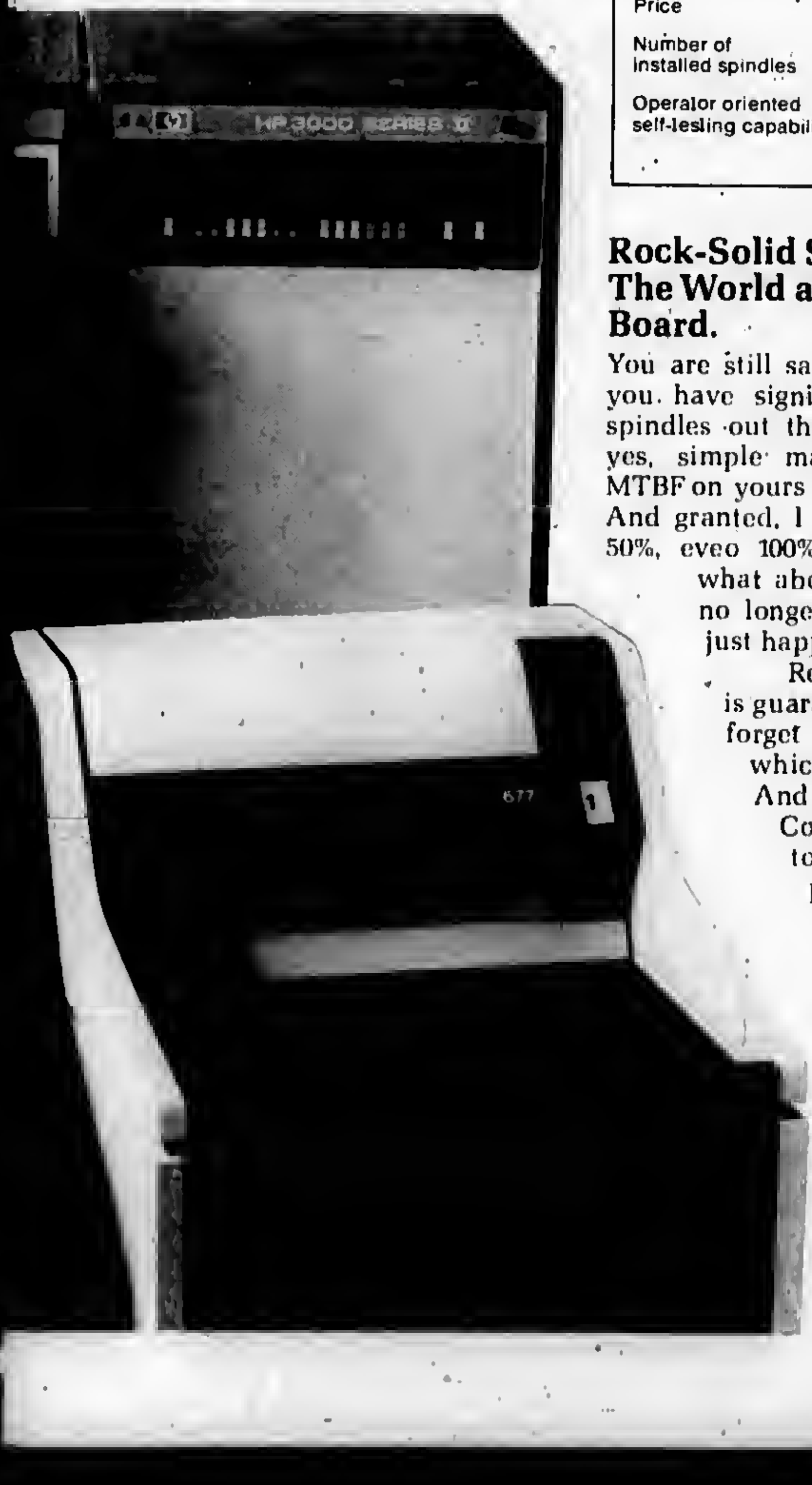
Reliability	Good	Much Better
Complete Maintenance Support	Yes	Yes
Price	Competitive	Super Competitive
Number of installed spindles	Less Than 1000	Over 15,000
Operator oriented self-testing capability	No	Yes



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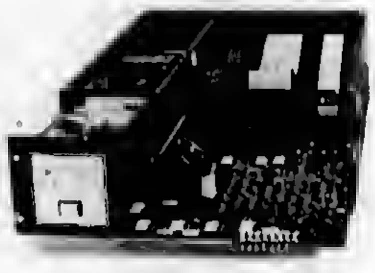

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The Waves Of Change

By Charles P. Lecht

CHAPTER X

We may well approach our crystal ball with the statistics reflecting past advances in computer technology in mind. They have been impressive, not to say incredible:

- Hand-held calculator costs have declined a hundred fold in 10 years.
- The cost of random-access memory (RAM) has declined by an average of 30% to 40% per year since 1970.
- The annual usage of logic gates (function) or bits of memory has increased 2,000 times in 17 years (i.e., in 1960 approximately 500 million transistors were produced, while by 1977 an estimated one *trillion* equivalent functions or bits were manufactured and shipped.
- The number of components per integrated circuit (IC) has nearly doubled *annually* since 1960 — from one component per circuit in 1960 to 256 bits or components per IC in 1967 to 16,384 components per IC in 1977.
- Disk drive capacity has jumped from 5M bytes in the early '60s to over 500M bytes today. Price per megabyte has also decreased nearly a hundred fold during this same period.

This very limited but highly representative sample of dynamic improvements could lead some observers to conclude that there is little room for further advances and that the really significant developments must be behind us. This chapter will, I hope, demonstrate that such conclusions are false and, in terms of electronic logic and storage, "future shock" shall not truly be upon us until the mid-1980s (assuming that political, economic and psychological forces do not work to delay it beyond its "natural term").

Nonetheless, today's technological environment, when viewed as a "happening" quite divorced from politics, psychology and economics, is indeed one of increasing transience. The seemingly continuous stream of product announcements, some coming from heretofore little-known sources; suggests an accelerating orchestral staccato.

New innovations, hoped for yesterday and ordered today to be delivered tomorrow, have a high probability of being called obsolete before installation. By obsolete, I do not mean useless. Rather, better alternatives will be made available.

But the din of product announcements also suggests the computer systems manufacturing organizations are "onto something big" in their quests for market position. Quite naturally, they must exploit their innovation continua to the fullest.

Users must reassess their ways of perceiving data processing, product and services procurement policies, or they stand a good chance of seeing their DP budgets inadvertently siphoned off for the good of technological progress with little to show for it.

For the conspiratorially inclined, this may look like a concerted plan of the computer industry; nothing could be further from fact. If for no other reason, the industry isn't that organized.

Not unlike the dilemma facing the broker with a seat on the exchange who must assess when a stock will bottom or top out, the DP manger is faced with buy and sell decisions of similar complexity. An increased interest in today's technological trends can go a long way toward resolving his difficulties.

But, in a sea of controversy over the ultimate ends toward which these trends are driving, remaining cool and conservative is mandatory. For the extrapolated end points of today's trends are absurd. These all seem to suggest that infinite capacity at zero cost will occur in the latter 80s. We know that's not going to happen.

While the user population may be experiencing instability in DP planning, such instability being caused by the increasing amplitude, frequency and impact of today's waves of change, the systems manufacturers are far more sure of what's happening and where it's all going. Their difficulties lie in accepting and reacting to change when it is adversely affecting their individual businesses and in accepting and capitalizing upon such change when it is not.

The research departments of those which can afford research are steadily racing toward fulfillment of their goals in improving systems intelligence, reliability, accessibility and serviceability — all of this in delicate balance with economic viability. Some of the major areas commanding their attention follow.

Processor Performance/Price

General-purpose processor performance can be measured in terms of "raw" Mips ratings - add time or number of multiplications executed per second. Obviously such comparisons do not take I/O capability or software efficiency, not to speak of user environment scenarios, into account, and therefore should not alone comprise the yardstick used in the evaluation of "systems."

However, it is true that in evaluating computers which share similar architectures (as in the case of the IBM

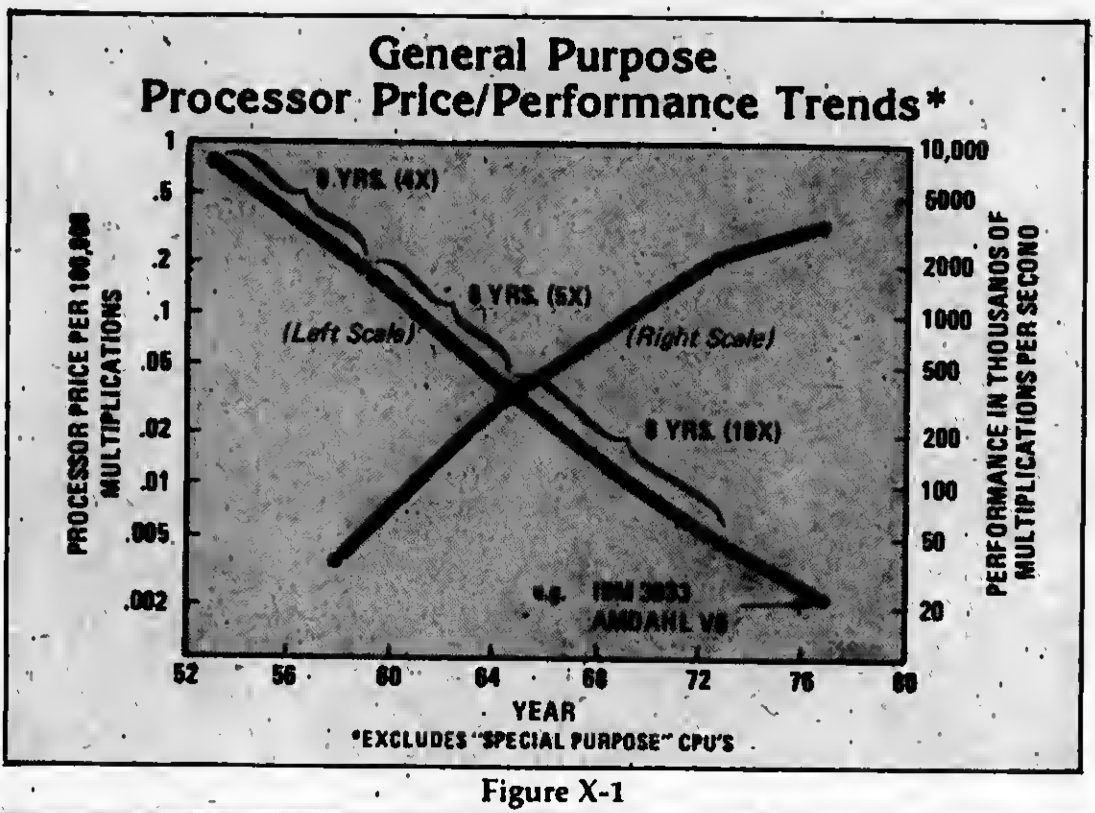
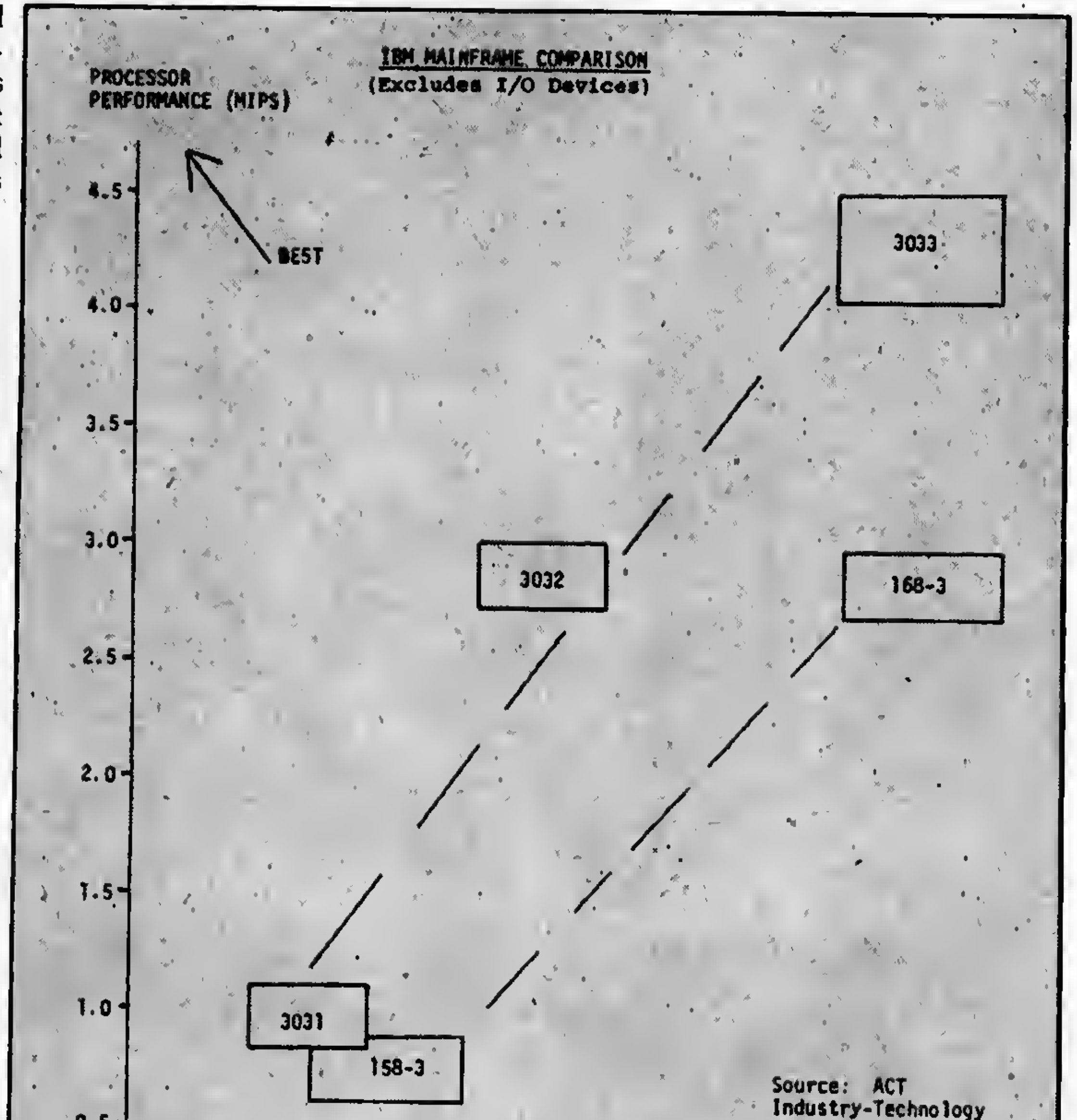


Figure X-1



NOTE: We use a box to show the approximate range of performance and price which increases with memory size; microcode assist usage, etc.

Figure X-2

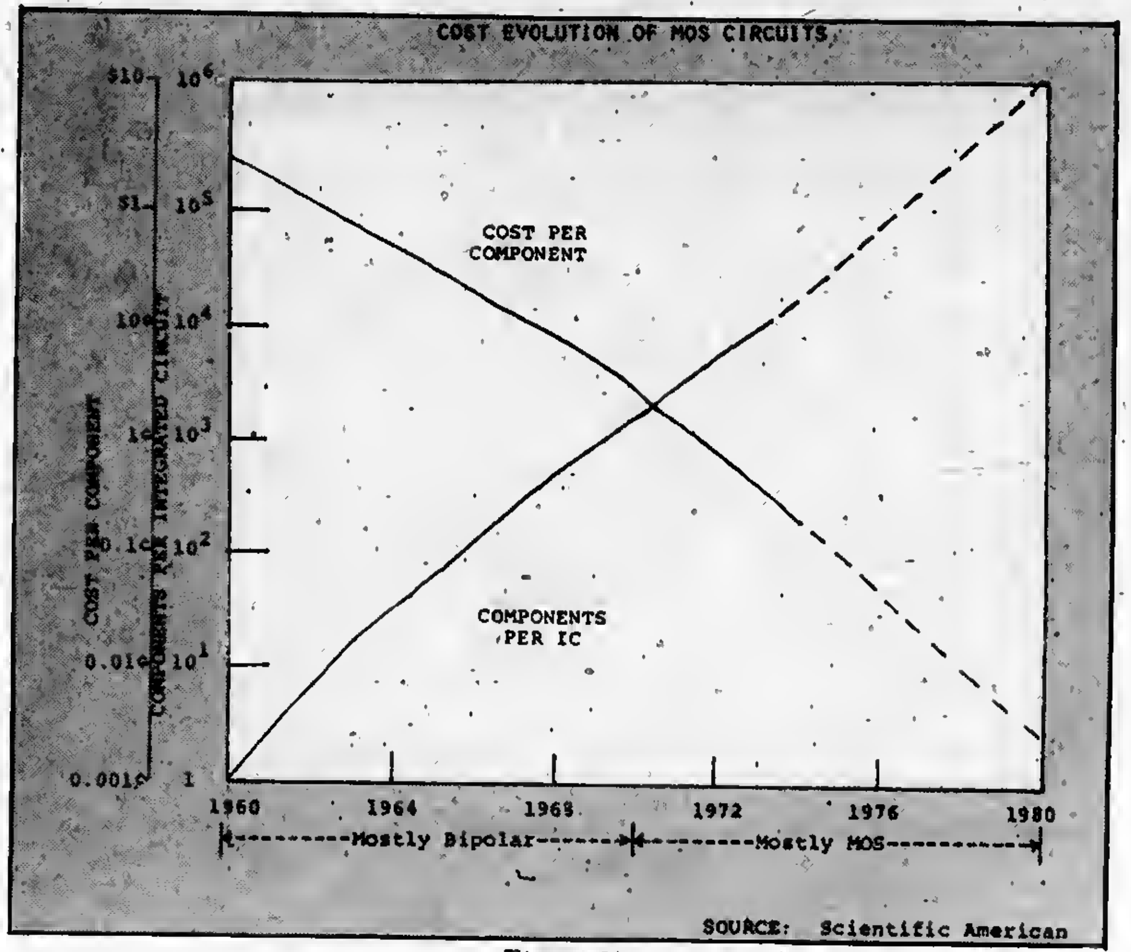
IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

This week, in his final chapter, Lecht takes a look at hardware technology trends, reviews the strong advances in price/performance made by the computer industry in recent years and predicts even greater ones. What is the technological breakthrough underlying the phenomenon that will make these advances possible? Lecht says IBM has the answer — the Josephson device, which some think will boost performance 10,000 times.

370 series, for example); these comparisons have greater validity insofar as the establishment of relationships or processor performance ratios is concerned.

The graph in Figure X-1 shows that "large-scale" general-purpose processor performance has increased from about 20,000 — to nearly 5 million Mips (or a 250-fold improvement) from 1958 to 1978. During this 20-year period, note that also the *rate* of performance price improvement has itself accelerated.

For example, 1953 to 1958 experienced a fourfold decrease in price per 100,000 execution/sec; during the next six years (1958-64), this same performance level was available at 20% of 1958 prices; and over the next eight years (1964 to 1972), another tenfold decrease in price (or increase in performance/$, to put it another way) ocurred.



SOURCE: Scientific American

Figure X-3

From 1972 to the present (1977), however, there was only a two- to three-fold improvement in performance/price (by IBM's 3033, 3032, 3031, etc.).

This "mere" two- to threefold improvement in CPU performance/price (chez IBM) during the past five years seems to represent a temporary condition and tends to verify that the 3033 (and 3032 and 3031) are simply "interim" — if not end-game — products.

In fact, the new IBM 3032 and 3031 both fit on the 3033 performance/price curve (see Figure X-2 below) and were predictable. Other multiprocessor versions of the 30xx are also expected by the second quarter of 1978.

While circuit (ECL) packaging and heat challenges may slow down the rate of Mips improvements for single-processor configurations (until the System/80 is introduced in 1979-80), multiprocessors (two to four CPUs) should compensate; i.e., each additional CPU should be priced lower than the initial processor complex.

Semiconductor Memory, Logic

"Conservative" IBM put the stamp of approval on semiconducor memory with the introduction of 370 series Mosfet storage technology in August 1972.

Various types of memories which use bipolar and MOS technologies are currently available. RAMs, read-only memories (ROM), Programmable ROMs (Prom) and electrically alterable ROMs (Earom) are all part of the current product offerings from the independent semiconductor industry.

The RAM is used for main memory and is presently available in both bipolar and MOS forms. MOS currently enjoys substantial advantages over bipolar because of its higher packing density, its improved access speeds, lower manufacturing complexity and lower cost, and it should become the dominant technology by the end of this decade.

Intel Corp. has been enormously successful in its pioneering efforts in the development of a 1K, p-channel, MOS, dynamic RAM (dynamic RAMs need periodic refreshment of the signal levels). Access time is currently 300 nsec, cycle time is 500 nsec and power dissipated is 100 microwatts per bit.

The 1103 was initially introduced in 1970 at a price of $60. By 1973, the price was averaging $4, or .4 cent/bit.

Current efforts in the semiconductor industry are being directed toward the achievement of production quantities of 4K and 16K n-channel MOS, dynamic RAMs. (IBM has already indicated that 32K MOS RAMs are available in the laboratory.) The n-channel product is highly desirable because of higher speed characteristics compared with p-channel.

In addition, chip size will increase and rapid price reductions may be anticipated once the manufacturing process has stabilized.

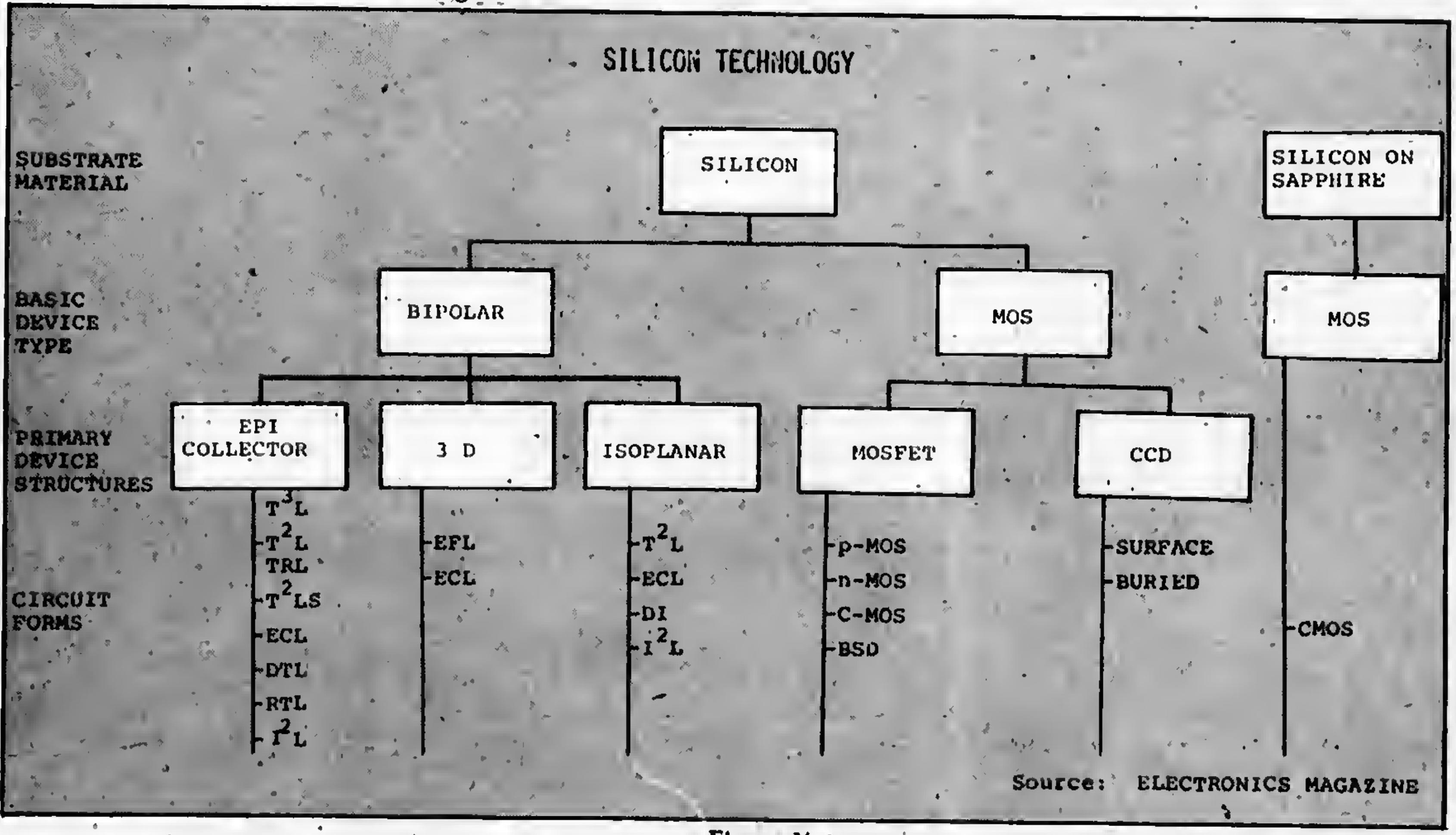
Mosfet devices have found wide use in the IC industry because they are naturally suited to planar surfaces. Thus they are ideal for production of large arrays by standard processing of silicon wafers. Field effect transistors (FET) occupy only a fraction of the chip area required for bipolar.

In addition, the manufacturing process to produce an MOS integrated circuit requires fewer steps than for bipolar, so significant cost reductions may be achieved. The price function advantage for MOS over bipolar frequently is as high as 10:1. Note that IBM recently switched from bipolar to MOS chips for the 370/138 and 148.

The graph in Figure X-3 shows cost per component for bipolar and MOS technologies. After 1970, MOS dominated the pricing structure. In that year, the cost per component was 1¢ with 1,000 components per IC.

Memory (RAM) prices declined by about 30% to 40% annually between 1971-77 and the extrapolated values indicate a cost per component by 1980 approaching .001 cent, with a half mil-

(Continued on Page 14)



Source: ELECTRONICS MAGAZINE

Figure X-4

In Depth: The Waves of Change

(Continued from Page 13)

lion to a million components or bits per IC.

The chart in Figure X-4 shows the silicon family tree and the various devices and circuit types.

Over the years, the ability to manufacture core has improved to the point where prices are about .2 cent/-bit. Typical core speeds are concentrated in the 500 nsec to one microsec access time range.

Now, however, high-speed semiconductor memory has become economically available in both bipolar and MOS forms, and mid-1975 was probably the turning point. Intel was selling its 4K Model 2107A-8 (a 420 nsec MOS device) for less than $12 in lots of 100 and this year it was anticipating .1 cent/bit to be a realistic goal.

The speed requirements of mainframe memory can be met by bipolar and silicon-on-sapphire (SOS) devices. While core, plated wire and MOS memories have in the past satisfied some of the speed requirements for large-scale usage, only bipolar and SOS devices appear to qualify at speeds exceeding 40 nsec.

The SOS manufacturing technique requires that very thin layers of silicon be deposited on a flat substrate of synthetic sapphire. Parasitic capacitance is reduced by a factor of 20 compared with standard MOS transistors.

When MOS circuits are manufactured with this process, they combine the high speed attainable by bipolar transistors with the packing density of MOS. At present, SOS structures are more expensive to fabricate than MOS.

Forecasts call for NMOS, bubbles and charge-coupled devices (CCD) products to equal or exceed the price/-bit of core after 1976. By 1977-78 bubbles and CCDs could be at prices below .1 cent/bit.

PMOS, which is already available at prices approaching those of core, has speed disadvantages but can perform many main memory tasks. Slower speed MOS memory chips are combined with high-speed bipolar caches (buffers) in the 370/158 and 168, Amdahl Corp. 470V/6 and V/7, the Univac 1100/80 line, Burroughs 7800, Honeywell Level 66, etc.

Logic Trends

While general-purpose mainframes have declined in price over time, typical minicomputer prices (with 32K bytes) have declined more rapidly, i.e., 18% to 20% annually between 1971-77 (e.g., the Hewlett-Packard Co. HP-2100A in 1967 vs. the HP 21MX in 1977). These significant improvements are directly related to IC developments. Today, only about 10% of a typical minicomputer's value is composed of ICs.

Logic families are closely related to IC development. In the late '50s, resistor-transistor logic (RTL) seemed to be the best way to go. By 1962, diode-transistor logic (DTL) had appeared. Transistor-transistor logic (TTL) was announced in the early 1960s, while initial versions of emitter-coupled logic (ECL) were introduced by Motorola in 1962. (IBM used versions of ECL in the 7030 Stretch machine in the mid '50s.)

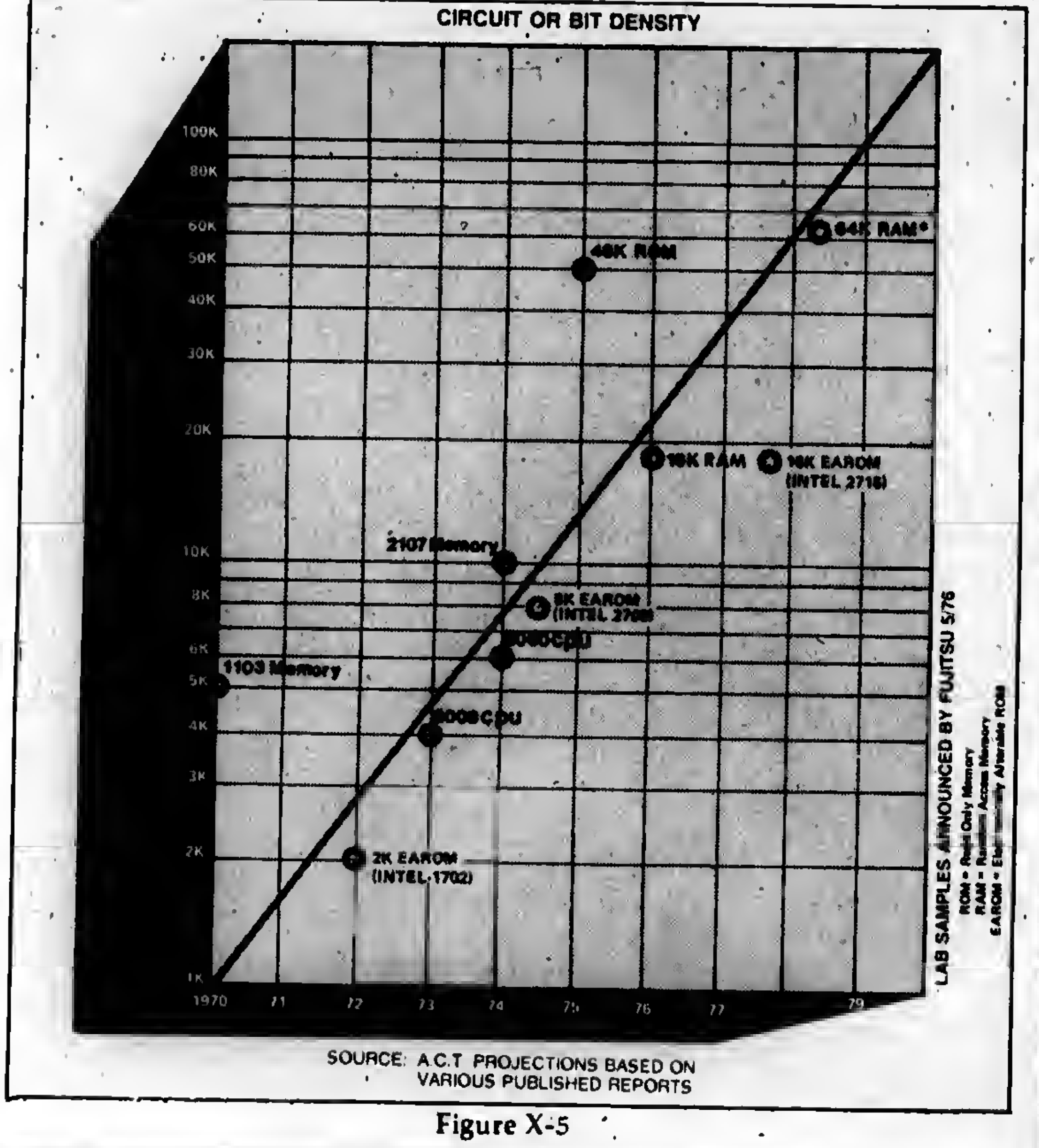
The basic requirements for any logic family are:

- Flexibility.
- Speed.
- Availability of complex functions.
- High noise immunity.
- Wide operating temperature range.
- Low power dissipation.
- Lack of internally generated noise.
- Low cost.

TTL (in various forms) and ECL are the primary surviving bipolar logic families used by most computer designers today. IBM has utilized a current switched logic (ECL) for its 370 computers.

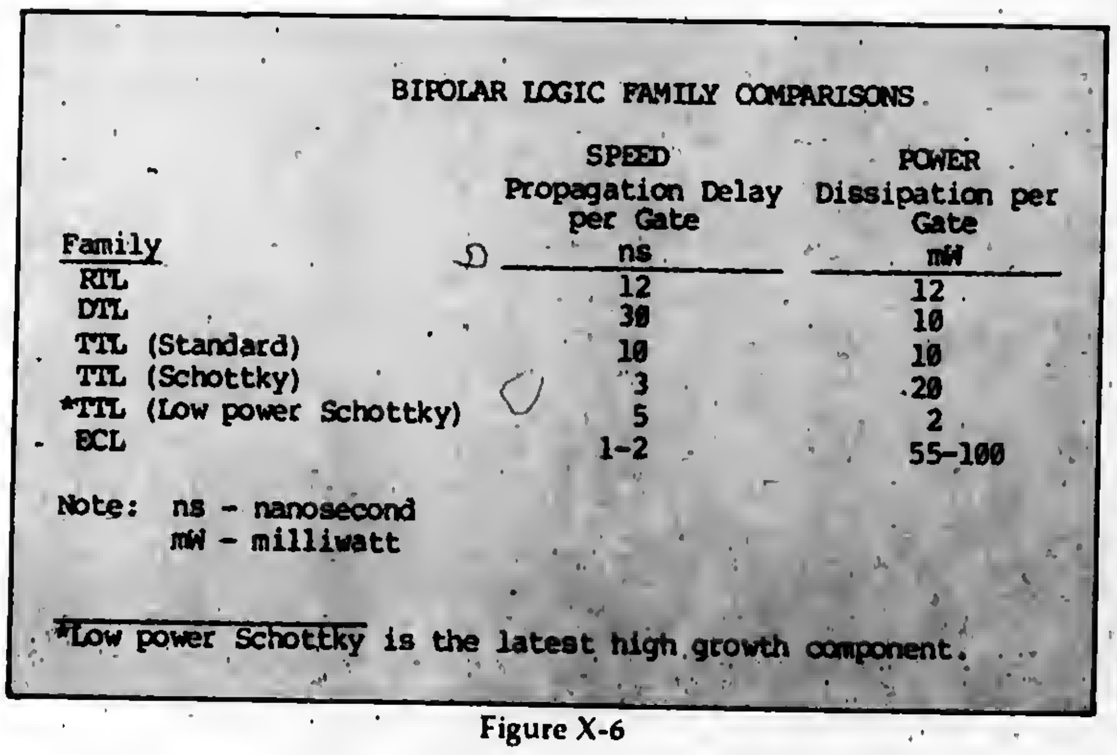
While such logic has the advantage of higher speeds, it is also generally true that as speed increases, so does power dissipation. Removal of circuit-generated heat is essential for reliable operation.

Figure X-6 compares logic families in terms of speed and power dissipation. Schottky TTL is a high-speed version of the standard TTL. From the table it can be seen that the progression from RTL to ECL leads to increased speeds



SOURCE: A.C.T PROJECTIONS BASED ON VARIOUS PUBLISHED REPORTS

Figure X-5



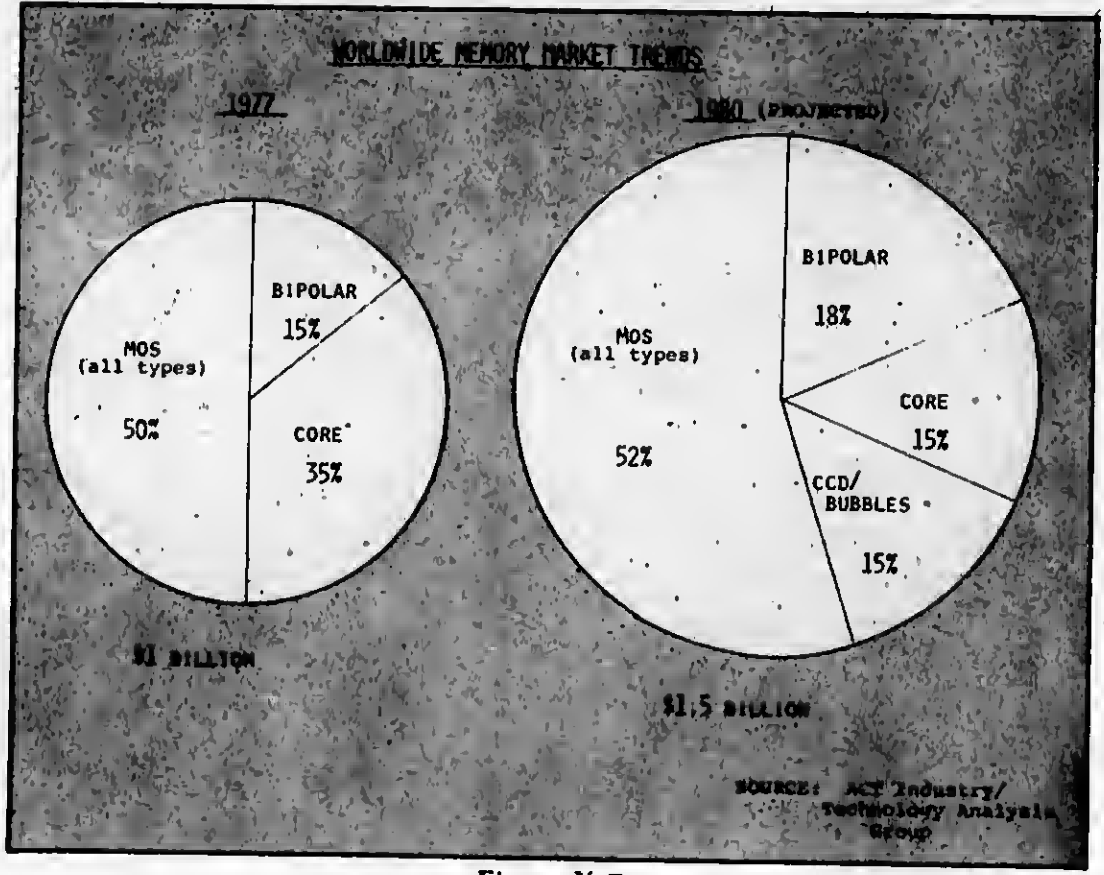
BIPOLAR LOGIC FAMILY COMPARISONS

Family	SPEED Propagation Delay per Gate ns	POWER Dissipation per Gate mW
RTL	12	12
DTL	30	10
TTL (Standard)	10	10
TTL (Schottky)	3	20
*TTL (Low power Schottky)	5	2
ECL	1-2	55-100

Note: ns - nanosecond
mW - milliwatt

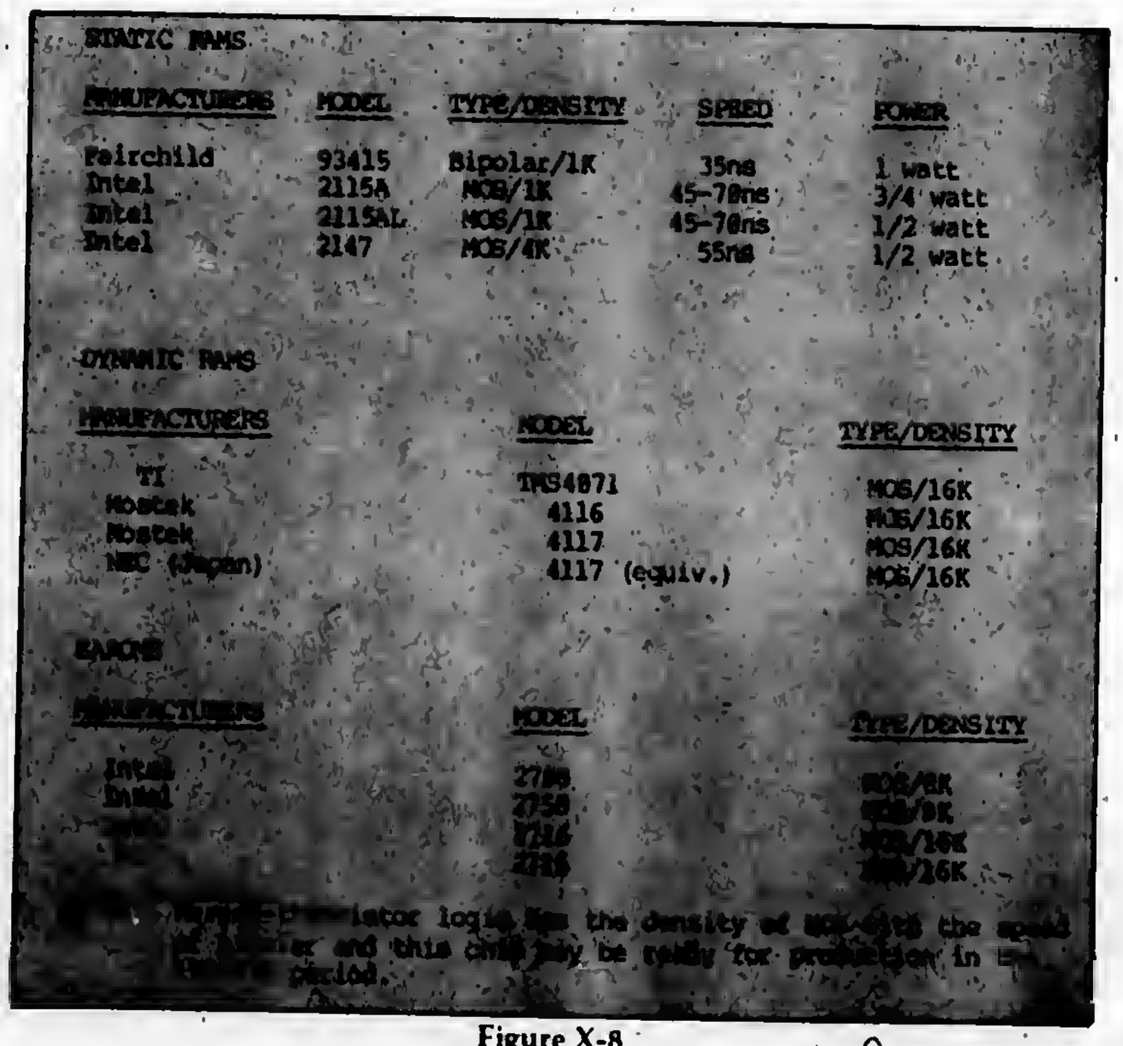
*Low power Schottky is the latest high growth component.

Figure X-6



SOURCE: ACT Industry/Technology Analysis Group

Figure X-7



STATIC RAMS

MANUFACTURERS	MODEL	TYPE/DENSITY	SPEED	POWER
Fairchild	93415	Bipolar/1K	35ns	1 watt
Intel	2115A	MOS/1K	45-70ns	3/4 watt
Intel	2115AL	MOS/1K	45-70ns	1/2 watt
Intel	2147	MOS/4K	55ns	1/2 watt

DYNAMIC RAMS

MANUFACTURERS	MODEL	TYPE/DENSITY
TI	TMS4071	MOS/16K
Mostek	4116	MOS/16K
Mostek	4117	MOS/16K
NEC (Japan)	4117 (equiv.)	MOS/16K

EAROMS

MANUFACTURERS	MODEL	TYPE/DENSITY
Intel	2708	MOS/8K
Intel	2758	MOS/8K
[illegible]	2716	MOS/16K
	2716	[illegible]/16K

[illegible] transistor logic has the density of MOS with the speed of [illegible] and this chip may be ready for production in [illegible] period.

Figure X-8

and higher dissipated power. Circuit designers currently have several choices available for optimization of speed and dissipated power.

Integrated injection logic (IIL) is a new design which will increase bipolar circuit density. These devices could move out of the laboratory next year.

At IBM in Boeblingen, Germany, the terminology used for the same basic approach is merged-transistor logic (MTL). MTL has the density of MOS with the speed of bipolar; this chip may be ready for production in the 1978-79 period.

The IIL approach utilizes gates which do not require current source resistors. The space required for an entire gate is 1 to 2 square mils, or the space needed for one transistor in the TTL family. It is capable of propagation delays approaching 5 nsec with power dissipation as low as one nwatt per gate.

The above advancements in ICs (ROMs, RAMs, Proms, Earoms, etc.) will permit "plug-in firmware" to be practical by the end of the decade. Burroughs already uses this concept in the Burroughs Scientific Processor (BSP), as do Texas Instruments' calculators (models 58 and 59).

Main Memory

The IBM 370/158 and 168 main memory requires nine times less area per cell than the older 360/85, and recent CCDs (from TI) of the one-cell variety have substantially increased relative bit density even further. However, the technology is quickly approaching a point where it will not pay to stretch it any further using *current* photolithography methods; i.e., the potential advantages from increased density vs. the technical problems of cooling, achieving the incredibly small line widths and so forth, will yield less of a payoff in the future.

In terms of photolithography, currently 6 microns is typical and this can be reduced to 2 microns using shorter wave lengths or electronic beam exposure techniques. IBM's near-term objectives appear to be to achieve 500 to 600 circuits on a 1/4-in. by 1-in. wafer.

The IC Leaders

Total worldwide consumption of all types of ICs (not just memory devices) has climbed to nearly $4 billion in 1977. Figure X-7 shows the memory circuit market share breakdown.

Top-tier companies include TI, Motorola, Fairchild and IBM (internal supplier only). Second-tier firms are Mostek, National Semiconductor, Intel, Advanced Micro Devices, RCA, ITT and Zilog, among others.

Recent high-speed, static and dynamic RAM competitive products (components) are shown in Figure X-8.

IC Storage in Japan

On June 7, 1976, Fujitsu announced it had succeeded in developing a 64K-bit RAM chip. The characteristics include 64,000 bits on a silicon substrate, performance in the 100- to 200 nsec access time range and substitution for electron beam and x-ray exposure techniques by current semiconductor fabrication processes.

Although this product has been developed in the lab, we should not expect 64K chips to be available in volume quantities before 1979.

This Japanese development was reported by Japan's Ministry of International Trade and Industry (Miti). The Miti project is comprised of five mainframe computer makers which were recently restructured into two groups: the Fujitsu/Hitachi/Mitsubishi and the Neac/Toshiba groups.

The Miti project has a budget of approximately $400 million and will concentrate on very large-scale integration (VLSI) logic and memories and other circuits. The Miti total budget over the 1977-80 period should approach $100 million for this VLSI activity alone, while an additional $190 million will be spent on a "fifth-generation" computer and about $117 million will be allocated to pattern information processing R&D.

Optic Communications Links

The significant advantages of fiber optics in computers include wideband width in the microwave range, no electronic interference, electronic isolation and loss of only 2 decibels per kilometer in glass fibers now in use

(Continued on Page 16)

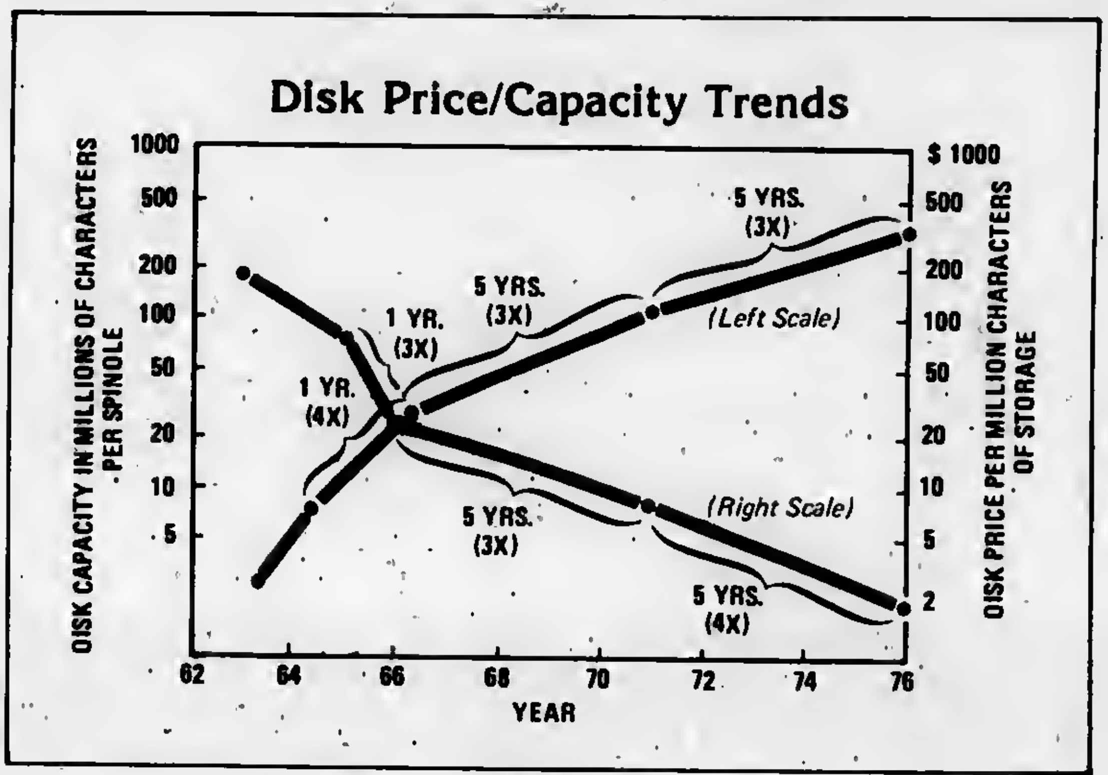
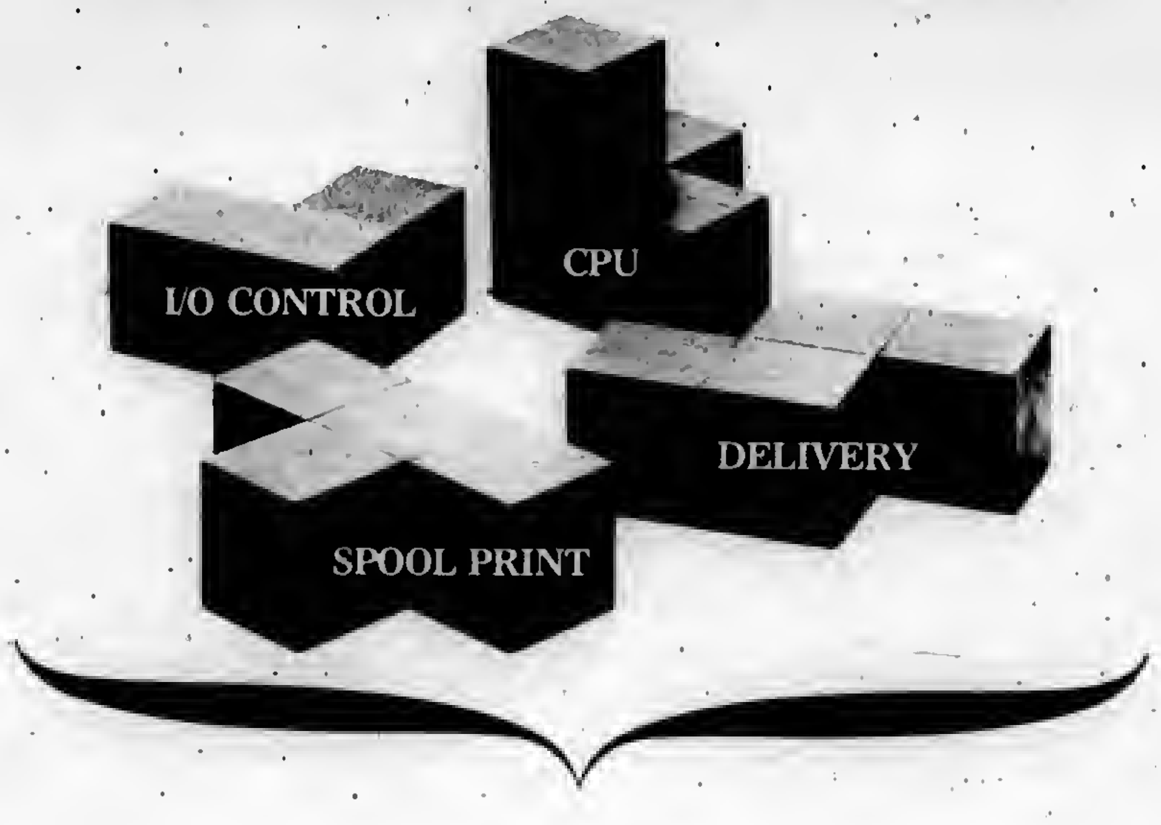


Figure X-9

On-Line Job Status Throughout Your Entire Data Center.



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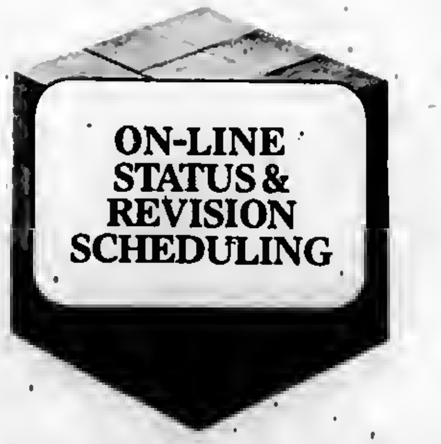
Job Status •
Abended Jobs •
Entire Network Status •
Overall Production Status •



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In Depth: The Waves of Change

(Continued from Page 15)

(which represents far better integrity than that characterizing microwave techniques).

Some of the work to be done in fiber-optics includes the development of a reliable laser source, fast detectors and new coupling techniques.

The current industry leaders of the above "new" technologies are:

- Electron-beam lithography: Bell Labs, IBM, TI and the Japanese companies.
- Bubble memories: Bell Labs, IBM, Rockwell, TI and the Japanese companies.
- Fiber optics: Bell Labs, Corning Glass, ITT, IBM and the Japanese companies (Fujitsu, Hitachi, NEC, etc.).

Subsystem Technology Forecast

Diskettes will have increased capacity through a combination of greater density and the ability to record on both sides. These improvements will increase effective capacity more than fourfold to over one million characters.

Current and future terminals (IBM "Orbit/Trinity") and other small systems will use the floppy disk.

In addition, stacks of floppies (hundreds) may be used as a low-cost, high-capacity alternative for archival storage.

Medium-Capacity Disk

"Gulliver" is IBM's code name for the new fixed disk that is currently integrated within the 3790, 3600 and other terminals. We can expect this important device, with a current capacity range of 5 million to over 27 million characters, to play a major role together with removable diskettes in future small business systems, minicomputers and other intelligent terminal products.

The recording density, speed and other attributes of the announced Gulliver file are unknown at this time. A 50M to 100M-character "Gulliver" file is anticipated before 1980, however.

Large-Capacity Fixed Disks

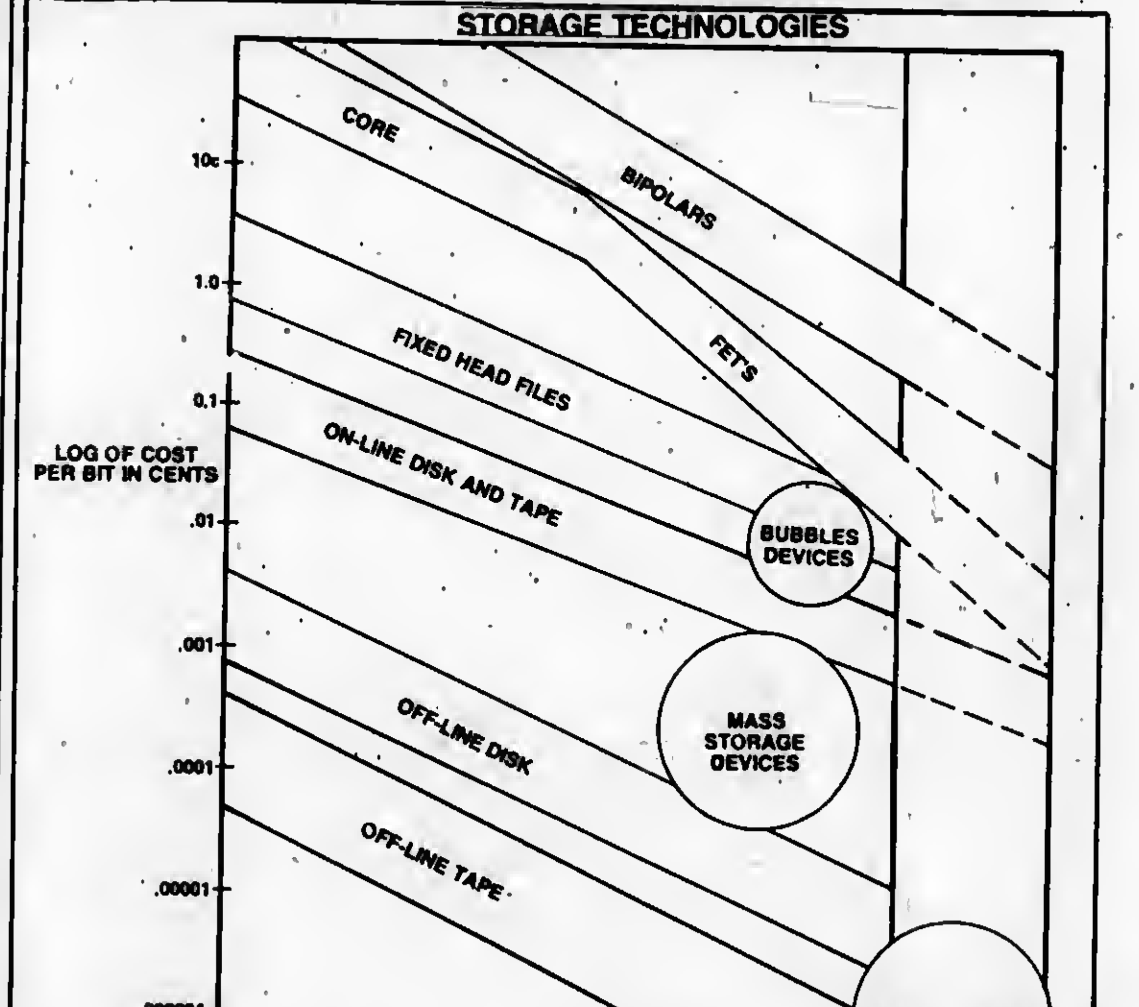
The original IBM code name for this nonremovable device was "Apollo." It is to utilize newly improved multilevel recording techniques, increasing capacity to 11,000 bit/in. and about 800 track/in. Such a device would accommodate in excess of one billion characters per drive.

IC multielement heads would be used (Burroughs has already announced its own, new IC-head device), and average positioning time would probably be in the 10 msec to 15 msec range.

This disk, together with the IBM 3350 and improved versions of the 3344 (more read/write heads), should be available on both the 370 series and System/80. Announcement of the "Apollo" is anticipated for 1978, with deliveries to follow in 1979.

Disk improvements in terms of capacity/$ were significant in 1965 (threefold improvement) and have been accelerating again during the past five years (see Figure X-9).

Texas Instruments' Silent 700 terminal uses 92K-bit bubble chips and Hitachi has a point-of-sale terminal which also uses bubbles for storage. IBM has built a device incorporating bubbles 1 micron in diameter with access times approaching 1 msec to as low as 100 microsec depending on the configurations and loop lengths.



SOURCE DERIVED FROM B.J. GREENBLATT & MUY HSIAO IBM AFIPS — NCC 1975.

Figure X-10

Bubble size appears to be material-dependent. The packing density is dependent on the line size that can be laid down on the bubble material and is also dependent on the exigencies of photolithographical technique.

In contrast to CCDs, the bubble process is more complicated and, according to IBM, bubbles are being directed toward analog device uses such as scanner applications.

The economic cross-over point for some additional applications for bubbles will occur in 1978 (.1 cent/bit, 1M-bit capacity) and 1980 (.03 cent/bit, 3M-bit density). During that period, fixed-head disks and some diskettes will be replaced by bubble devices.

Nonimpact Printers

A magnetic ink-jet printer was recently introduced by IBM for the office equipment or word processing business of its Office Products Division. This device has a print speed of up to 92 char./sec; but is relatively expensive.

More ink-jet printers of higher speed are expected to be introduced over the next five years. Devices with speeds exceeding 200 char./sec which incorporate multielement ink-jet heads can be anticipated.

Advantages of ink-jet devices are better resolution, enhanced print quality, lack of noise and potentially higher reliability.

Mass Storage Devices

Additional versions of the IBM 3850 are anticipated — a larger model with twice the current density (or 940 billion characters) and a smaller version for the 370/138 and 148 systems are expected to be introduced by 1978.

Within the System/80 timeframe, a 4X capacity model should be available and other advanced structural improvements can be forecast: the use of bubbles or CCDs as another level in the storage hierarchy; faster staging disks (more read/write heads); and, most important, a cache-type buffer.

Figure X-10 attempts to put all the various storage technologies together so one can appreciate the distinct spectra of capacity and cost and the relative improvements over time (past, present and future):

(1) Mosfets will dominate and cover most on-line, high-speed main storage needs during the next 10 years.

(2) Bubbles should replace most fixed-head disks, drums and diskettes by 1980.

(3) Moving-head disks will continue to improve in capacity and cost; no replacement device is anticipated for at least 10 years.

(4) Mass storage devices (e.g., the IBM 3850) of various designs are quickly closing the "gap" between on-line disk/tape and off-line disk.

(5) Archival files are anticipated by 1983-85 as a cost-effective replacement for off-line magnetic tapes and disks in terms of easier access, speed and equivalent price per bit.

Gas Panel Displays

Some plasma displays have already been introduced by both Burroughs and IBM, in particular the IBM 3600 financial terminal. Additional displays of this type are expected over the next five years.

IBM plans to build a 14-in. by 14-in. panel with multilevel addressing techniques to reduce the cost of drivers.

Advantages of plasma displays are high resolution, flicker-free operation, greater reliability, inherent storage (no requirement to refresh the display screen) and multicolor capability.

The Waves of Change *is on the presses and will soon be available. Those wishing to acquire copies of the book can direct their inquiries to Carl Menkel at Advanced Computer Techniques, Inc., 437 Madison Ave., New York, N.Y. 10022.*

The flat design permits them to be used in many unique arrangements for terminals or consoles.

Josephson Technology

A thorough review of recent IBM technical publications, systems journals and a tour of the T.J. Watson Research Center suggest that the successor to System/80 *can* emerge by

(Continued on Page 18)

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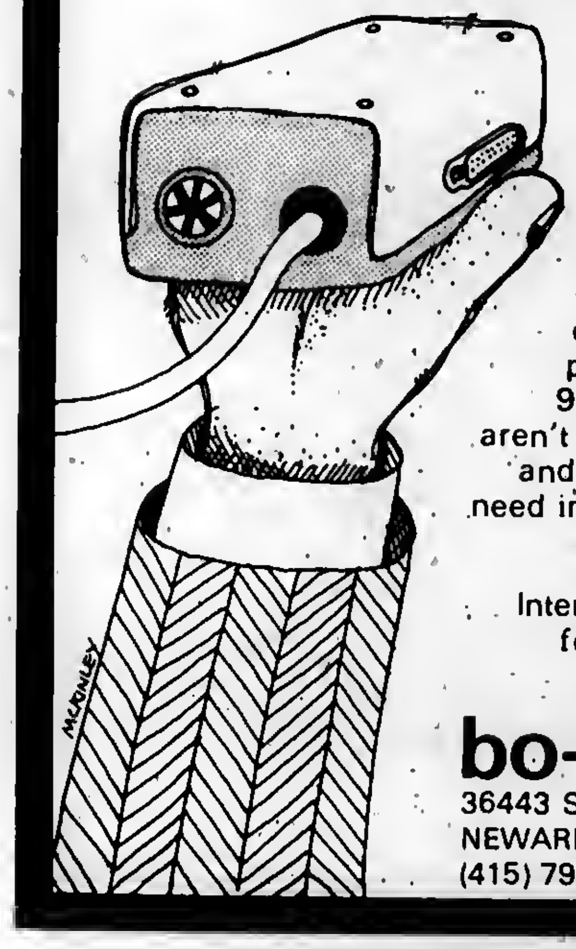

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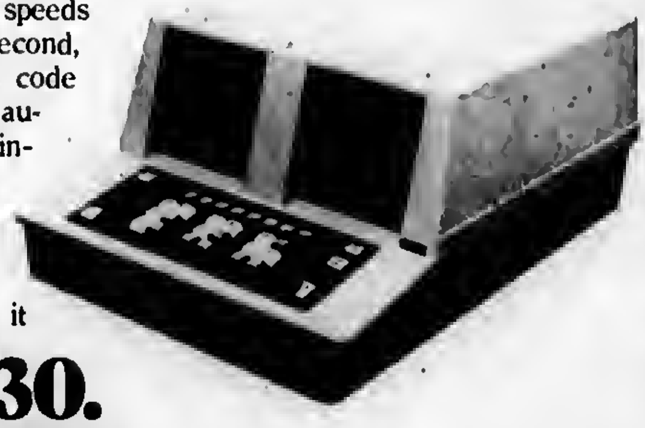

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ANDERSON JACOBSON

In Depth: The Waves of Change

(Continued from Page 17)

1985-87 (if IBM decides to announce it in that period) and that the successor mainframes (CPU and memory) will be far more revolutionary with respect to System/80 than System/80 will have been relative to System/370.

The technological breakthrough underlying this phenomenon is called "Josephson Tunnel Junctions" (named after Dr. Brian Josephson, who discovered the Josephson effect in 1962).

Josephson devices (logic and memory) are superconductors which operate at the temperature of liquid helium (4.2° Kelvin), with switching speeds in the picosecond range (100 to 200 times faster than today's fastest semiconductors).

They are of three-layer, laminated construction with outer layers of superconducting materials separated by an insulating layer, and they generate only one-thousandth as much heat as do current techniques.

The entire Josephson computer including memory (but excluding I/O devices) may be encased in liquid helium with an outer chamber of liquid nitrogen. Recent technological fallout from the National Aeronautics and Space Administration program has solved most of the cryogenic technical problems. IBM has been actively working on Josephson devices for over six years.

The key questions are *not* technical (although some problems remain to be solved), but rather:

- Whether IBM corporate management will decide to impact System/80 in the 1985-87 timeframe.
- Whether it makes good business sense to offer this kind of horsepower (i.e., whether the marketplace can absorb it or whether a 100- to 200-fold performance increase will saturate the marketplace.
- Whether future peripherals can keep up with superconductor technology (or how "balanced" systems can be created).
- What the competitive environment will be like during that period.

Josephson capability is *not* limited to large-scale, high-priced processors — the technology can cover a very wide spectrum of systems; it is, in fact, a very small (physically speaking), large-scale computer.

A Josephson multiplier was described recently in the *IEEE Journal of Solid-State Circuits* and in the May 1976 issue of IBM's *News/Research*. The multiplier, the most complex Josephson circuit yet presented in the literature, contains 45 gates (a gate performs a single logical operation such as "and" or "or"). Projections indicate that two 4-bit numbers could be multiplied in 12 nsec.

The product of power dissipation and delay per logical operation, a standard figure of merit in switching circuits, is about *1,000 times better* in the Josephson multiplier than in present semiconductor circuitry. Furthermore, reported detailed test results indicate in the *IEEE Journal* "the various design considerations — signal levels, timing, impedances — are sufficiently well understood to provide high performance and reasonable tolerances. The tests also confirmed the substantial progress that has been made in fabrication techniques for sizable arrays of Josephson devices and supporting circuitry."

According to Dr. Eugene Fubini, a private consultant on science and technology (former IBM vice-president and group executive responsible for research and advanced systems development from 1965 to 1969), "in seven to eight years (1983-84) we should expect 10,000 times greater performance (from Josephson technology) ... a megabit storage chip will cost approximately $30 by 1985."

Advanced Computer Techniques, Inc. believes 10,000 times greater performance is *not* probable at that time; however, a 100- to 500-fold improvement is practical by 1985, and this is

pension hours equal payroll hours?

Not unless you have a system that can post pension hours one for one, with hours actually worked and paid, including vacations, jury duty, layoffs, and military time.

Otherwise you must credit 45 hours for any time paid on a weekly basis, 190 hours for any time paid on a monthly basis. . .

Joe Nestor can tell you more about the problem and the Wang solution for 360/370, Honeywell, Burroughs users, at (617) 851-4111, Wang Laboratories Inc., Lowell, MA 01851

WANG

In Depth: The Waves of Change

sufficient to change our "style" of programming.

These incredible speeds and capacities will dramatically change the way we program future computers. There will no longer be much concern about efficient code or wasteful use of main memory.

In fact, programmer/analysts can try *all* possible solutions to a problem since it takes a few nanoseconds per try. Trial and error, interactive programming and analysis would increase greatly with this kind of capability and drastically change the way we create software.

Fubini also states that while "in the past we were problem rich and solution poor" Josephson technology will reverse the situation, making us "solution rich and problem poor" in the near future.

The initial markets for Josephson devices and computers will likely arise in connection with federal government projects, military applications and weather forecasting and eventually spill over into the commercial section by 1985-87. A key question is how we can utilize (program) this technology effectively when one second of computer time may take a thousand man-years to program.

I believe that any advanced system planned for shipment in the 1979-80 timeframe must reflect an awareness on the part of the vendors of the impact of Josephson technology in 1985-87. Will the hardware and software architecture of the 1980s be adaptable to Josephson technology? Will the major manufacturers invest sufficiently in this revolutionary technology to remain competitive in the 1980s? What new programming techniques will be necessary to tap this incredible resource?

Computers are today just beginning to affect our lifestyle, and we have probably reached the point where we cannot return to the manual information-handling process in many application areas — in airlines reservations, process control, command and control, etc.

While it may yet be possible to argue that if you destroyed all the computers in existence today it wouldn't *seriously* affect your life, it seems equally obvious that by the early 1980s we would be drowning in paperwork. Progress would necessarily retreat without the powerful computer systems and networks upon which a service-oriented society is — inescapably, we would say — dependent.

Nor is this an alarming picture. Computer technology can directly help to solve the energy crisis and pending natural resource crisis. Some examples: paper will become the exception medium for human communications, being replaced by on-line storage and retrieval devices; microprocessors will improve transportation efficiency, reducing fuel consumption; there will be less need to travel when low-cost computers and networks permit effective human interaction from a terminal in the office or home.

And products — appliances, automobiles and other machines — can be designed to last longer (through microprocessor failure prediction/detection and self-repair/adjustment), thus reducing or at least holding the line on the amount of energy and natural resources required to manufacture a product — the current "planned obsolescence" game will itself become obsolete in the face of resource shortages and the resulting demand for products with built-in "survival" factors of two to five times current product life expectancy.

Of course, the fact that we *can* do something doesn't mean we have the will to do it. However, the expected shortages of most of the world's prime resources will generate an almost irresistible demand for more intelligent, *purposive* usage of such of those precious resources as remain.

Thus, on one level, the demand for computer storage and easier access to vital data will ensure a new generation of dramatic growth in the computer industry (however altered in shape and character the industry will be by the mid-1980s). But most important of all, this growth will be one of the fundamental factors in ensuring the survival of the community of man, in a way that makes the prospect of survival less grim than it otherwise might be.

The computer industry can and must be in the forefront of a movement away from artificial services and toward necessary, truly life-enhancing ones. It will be good — and gratifying — to participate in an "industry trend" with such potential.

Lecht is the author of four previous books on computer-related matters.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and the Data Processing Management Association.

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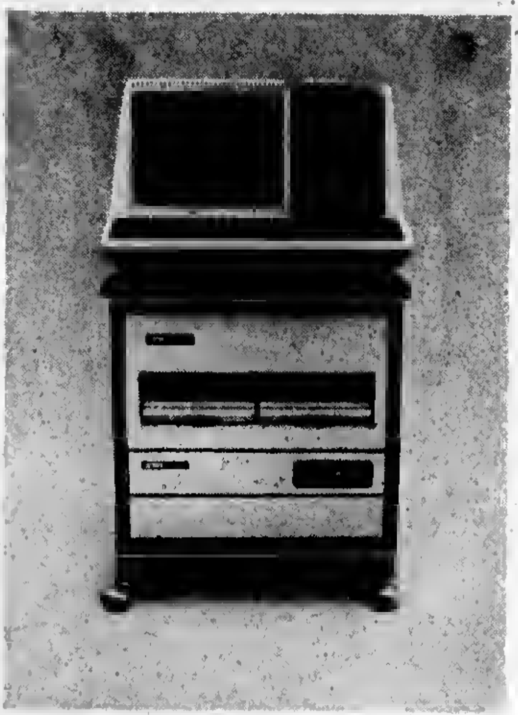

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Eight of the world's most popular small computer systems now cost up to 21% less.

Effective October 17, eight of Digital's packaged systems have been reduced from 8% to 21%.

Some of Digital's disk prices are down. Some of Digital's terminal prices are down. As a result, almost all of Digital's disk-based computer systems now sell for less.

But these eight packaged systems are reduced even further!

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What makes such savings possible? Two years ago, Digital began gearing its greatly expanded manufacturing capabilities around the needs of people who buy basic systems. And now, that new capacity is on-line and producing. We pass those savings on to you. That has always been Digital's way.

Before you buy another system, get on the phone to the nearest Digital office. Let us tell you the details of our new packaged system plans. Let us show you why 50,000 PDP-11s have already been sold — how we can save you money today, and keep saving you money tomorrow. Or write Digital Equipment Corporation, P.K3-M18 121 Parker Street, Maynard, MA 01754.

digital

From Digital Now.

Now a new disk, new terminal price, and a new packaged system from Digital save you $45,500.

Consider a minimum PDP-11/70 configuration for 16 timesharing users.

Before October 17, the basic system included a PDP-11/70 CPU with 256 kilobytes ECC MOS memory, an 88 megabyte RP04 disk pack with controls, a TE-16 1,600 bpi mag tape and controls, and the RSTS/E timesharing operating system. Packaged price: $137,600. Sixteen VT52 video terminals at $2,200 each made the total price $172,800.

Now…

Digital has a new RM03 disk pack with 67 megabytes. Digital has reduced the prices of its terminals. And it has a new packaged system configuration for more savings!

The basic system now includes the same PDP-11/70 CPU with the same 256 kilobytes ECC MOS memory. The same TE-16 mag tape and controls. The same RSTS/E operating system. But it also includes the slightly smaller RM03 disk pack. Packaged price: $103,300. Four VT-52 "four-packs" sell for $6,000 each. Total price: $127,300.

That's $45,500 less!

Digital has new disk prices that affect almost all disk-based systems. New terminal prices. New packaged system prices.

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Now new terminal prices, and a new packaged system from Digital bring a PDP-11/03 down to an incredible $10,000.

Consider the PDP-11/03 – already one of the most popular microprocessor-based systems in the world.

Before October 17, the basic system included a PDP-11/03 CPU with 32 kilobytes of MOS memory, a dual RX01 floppy disk subsystem providing 500,000 bytes of disk storage, an RT-11 operating system, and an LA36 DECwriter, or a VT52 video display, as a terminal. Price: $12,200.

Now…

Digital has reduced the price of its terminals. Digital has also introduced the concept of packaged systems, standard configurations that permit the passing along of manufacturing savings.

The basic system now is identical to what it was before October 17. But the packaged system price is now $10,000. An 18% reduction.

Digital has new disk prices that affect almost all disk-based systems. New terminal prices. New packaged system prices.

For complete information get on the phone to the nearest Digital sales office. Or write Digital Equipment Corporation, PK3-M18 121 Parker Street, Maynard, MA 01754.

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From Digital Now.

All prices apply to U.S. only.

Editorial

Voice of the User

It is unfortunate that many of the major telecommunications issues are decided without input from users. All too often, these issues are debated in an atmosphere where only the interests of common carriers and vendors are adequately represented.

Because the user viewpoint is so often missing, it often gets neglected in the deliberations of regulatory and legislative bodies.

Recently, however, a large user organization has begun to make the voice of the user heard where it counts. That group is the Tele-Communications Association (TCA), which appears to have embarked on an active program of speaking out on communications issues affecting the interests of users.

In recent months, the TCA has taken a position against the concepts of the AT&T-sponsored Consumer Communications Reform Act, favoring instead the continued policy of competition begun by the Federal Communications Commission (FCC). In support of this policy, several delegations from TCA have visited Washington to meet with policymakers in Congress and at the FCC.

Although it may seem quite normal for the TCA to speak out on important issues, the organization underwent some internal soul searching before its members were convinced that a more active role was in their best interest. This policy of speaking out on the issues will give users a much needed representative in Washington and elsewhere when important telecommunications issues are being debated.

A user organization speaking out encounters difficulties because many of its members are businesses which may have taken corporate positions. These corporate positions may not always jibe with the feelings of a majority of the members on a particular issue.

But TCA appears to have faced this conflict and decided that silence can be even worse for user interests than some disagreement within the ranks.

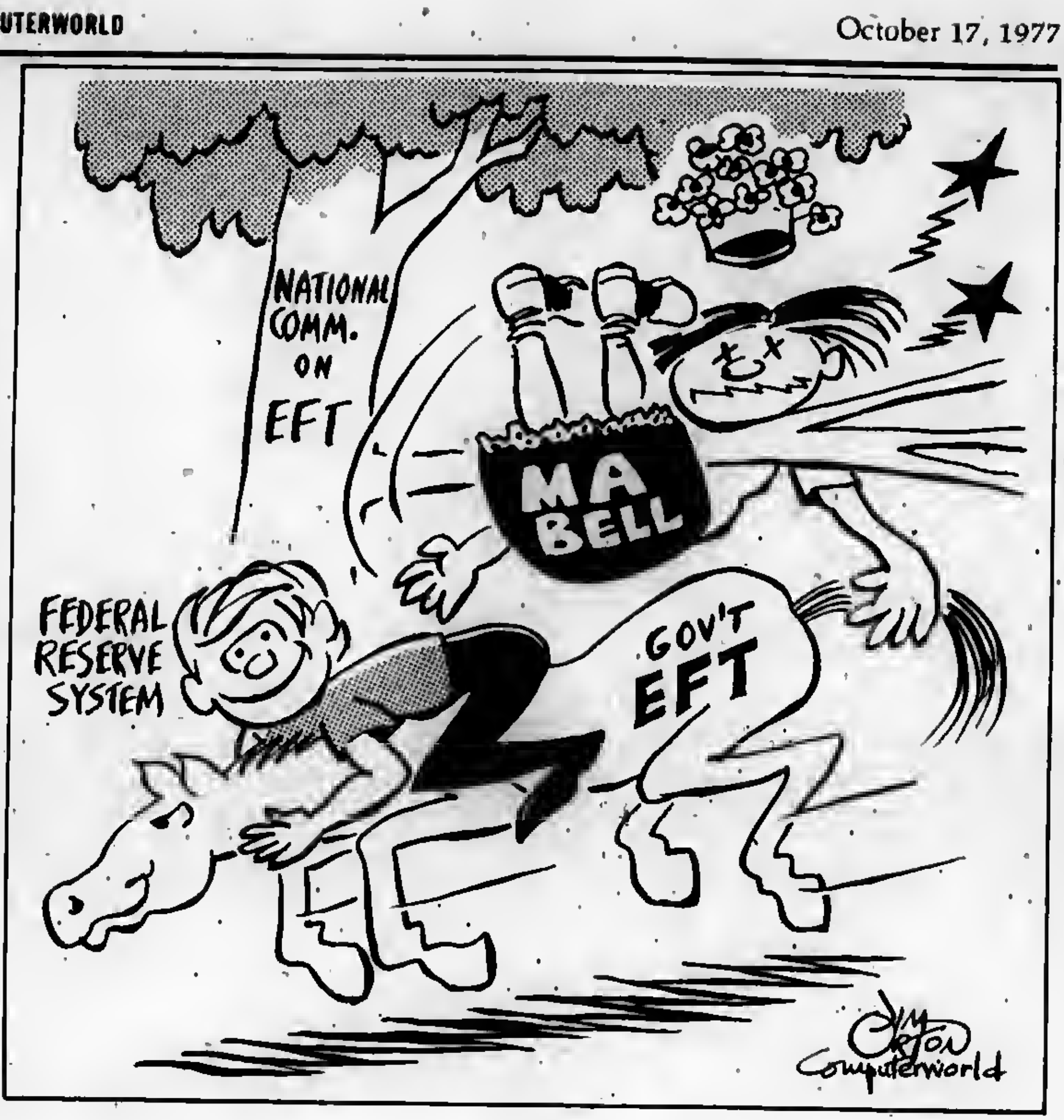
Unlike some other user groups which avoid facing this issue by prohibiting organizational positions, TCA has become a refreshing force in an area where the user is heard all too infrequently.

Daniel Grove, the newly elected TCA president from Motorola, Inc., shows every indication that he wants his organization to continue to speak out. Although in the long run this policy may trouble some individual members, in the final analysis it will make TCA vibrant and responsible, bringing the views of the user to those who most need to hear it.

It is to be hoped that TCA is afforded every opportunity to have its positions publicized and that it receive the support of users, both members and nonmembers, in its efforts.

The very future of telecommunications in this country is now being debated in Washington. This question is too important to be left to the vendors and carriers alone.

TCA is doing precisely what is needed to protect the interests of users. For this effort, the group needs input and deserves both encouragement and support.



Data Past

Five Years Ago
Oct. 18 1972

NEW ORLEANS — The FBI requirement that computers be dedicated to law enforcement in order to access its Computerized Criminal History (CCH) files was called a "power play" by DP experts and criminologists meeting here. Panelists and audience members at the international crime symposium contended the requirement did not ensure the security of data.

— — —

NEW YORK — After four years of training, IBM and the government put on their antitrust boxing gloves, but the manufacturer preferred to wait until after Nov. 7 for the heavyweight match. Nevertheless, a federal court judge here refused IBM's request that the government wait until after the election to list its goals in the suit and instead called for the parties to appear Oct. 16 so the Justice Department and IBM could make formal statements.

Eight Years Ago
Oct: 22, 1969

WASHINGTON, D.C. — The user costs of information processing would probably rise 100% within five years, a market research executive told the Law of Software Conference here. But the increase would be reasonable because expenditures would be relatively low, according to Patrick J. McGovern, president of International Data Corp., who said the increase would result from emphasis on better software as the user accepted more responsibility for the efficient operation of his system.

— — —

EL SEGUNDO, Calif. — Xerox Data Systems (formerly Scientific Data Systems) adjusted prices and lowered some rental rates. The biggest cut was in one to three-year rates. Prices dropped an average of 5% with some reductions as high as 14%, Xerox said.

Letters to the Editor

In Defense of the NCIC

I read with concern the editorial in the Sept. 19 Computer*world* in which you raise serious questions as to the overall worth of the National Crime Information Center (NCIC), as well as the FBI's management of the system.

Law enforcement authorities are uniformly enthusiastic in their support for a telecommunications network that deploys computer technology on behalf of law-abiding society in the war on crime. Your assertion that the NCIC is in "the hands of the FBI" does not take into account the fact that there is a tremendous input from the entire criminal justice community.

The NCIC Advisory Policy Board, comprised of 26 top-level criminal justice administrators, has the responsibility of making recommendations to the Director of the FBI pertaining to general policy, concept and operational principles of the NCIC. Twenty members of the board are elected by the NCIC users across the entire country. The remaining six are appointed by the Director of the FBI.

As I am sure you know, NCIC computer entries are made by — and always remain the property of — a broad spectrum of local, state and other federal law enforcement agencies throughout the U.S., the Commonwealth of Puerto Rico and Canada.

The FBI certainly acknowledges its responsibility as manager of the system and to that end, in order to assist in maintaining timely and accurate NCIC data, provides printouts on a regular basis to each participating agency for validation of records in the system. The initiating agency furnishes written certification attesting to the accuracy of that agency's NCIC entries.

Augmenting this ongoing validation process are automatic computer edits, internal control samplings and automatic purging of records after the passage of a prescribed period of time. We are firmly convinced that these procedures, handled jointly by the FBI and the participating agency, enable the system to function with more accuracy than that implied in your editorial.

The editorial characterized as unimpressive a "hit" ration derived from 250,000 transactions daily in a system consisting of more than 6.5 million records. Those 250,000 transactions, however, include new entries, deletions, modifications — transactions the very nature of which could not possibly yield a "hit."

While on this subject, I would strongly emphasize that a negative response can be of great value to a law enforcement officer in certain situations. Further, positive responses obtained daily from the system are invaluable to law enforcement in the areas of fugitive apprehensions and in the recovery of stolen property.

For your information, the study which was the basis of your Sept. 19 editorial was the result of a two-hour orientation briefing and tour of the NCIC facilities. We in the FBI have no objection to an in-depth study of the NCIC; we are convinced that such a study would rousingly confirm the NCIC's efficiency and effectiveness as an anti-crime tool.

And so long as the NCIC daily dispenses numerous items of information relating to the whereabouts of fugitives from justice, stolen property and missing persons, its necessity is readily apparent.

Clarence M. Kelley
Director
Federal Bureau of Investigation
Washington, D.C.

(Other letters on Page 26)

Maintenance Appraisal Critical In-House Job

By Jack Stone
Special to CW

The concept of DP "management perspective" (or the lack thereof) has always intrigued me. Often in our workaday DP world we are so trammeled by the crisis-of-the-moment that we lose the precious insight to view the DP world as it truly is.

Let's take a case in point — something as hard-headed as hardware maintenance. And let me ask you a few rhetorical questions.

Do you know for a fact that during preventive maintenance time the technician is not causing more problems than he is curing? Do you have the objective basis for determining that one vendor's disk drives are better maintained than another's? Does your installation have standards of reliability performance, based on history, to help determine whether or not you bought yourself some lemon-styled system components?

If you are one of a select group of 99% of the DP management population, your response to all three questions more than likely is, "Why hassle me about maintenance? I contract it all out to my friendly vendor and he's doing a grand job."

"Gotcha!" I say. "Prove that he's giving you a gold-star performance — and I mean facts and figures!"

"Now look here now!," you say. "I pay him good and plenty money to keep those boxes buzzing. Equipment up-time is *his* responsibility!"

If the foregoing is your response, this is where dear reader, you and I part company. Because management is your responsibility, pure and simple. You contract out the implementation because the vendor has skilled personnel on board whose services you can buy at less cost than supporting an in-house staff. But you still have the responsibility to structure the maintenance plan and control its execution. You have the responsibility to maintain proper records to gauge for yourself the performance of both the vendor equipment and service personnel.

To obtain an expert's viewpoint, I interviewed George White, coowner of Tagg Associates, an Arlington, Va., software firm and one of the brightest innovators of information systems for computer center management.

Q: As I recall, most airlines, steel mills and railroads have their own in-house maintenance force. Computer installations, in effect, abdicate their responsibility in this area. Why?

A: A lot of it has to do with history and tradition. Maintenance management is seen as just another headache which can be adequately handled by an outside vendor.

Q: But is the function being properly handled?

A: Sorry to say, very few installations have an objective basis for determining the quality of the maintenance vendor's work. They neither have standards of reliability nor organized methods for obtaining objective measurements of reliability. And maintenance contractors are not known for their willingness to share reliability information with their customers.

The Human Connection

Q: What can the installation do to wrest back some of the control it has lost?

A: First, DP management must change its perspective on its responsibility for maintenance. It should understand that, through appropriate management action based on proper information systems support, it can improve reliability performance by improved control over the maintenance contractor.

Q: But don't customers meet regularly with their maintenance vendors to discuss problems?

A: Sure they do. But when you take a broader outlook, what's actually happening is that the customer is complaining about how badly the vendor is managing the customer's maintenance program. He usually doesn't beef about the quality of technical personnel. Of course, you see the problem immediately — no vendor can possibly have the same business objectives as the customer. And, as you can expect, most customer yelping improves matters for a while, then support may start to fall off again.

Q: What type of information systems support do you see as necessary for the DP manager?

A: Well, in brief, the DP manager must maintain a comprehensive data base of his hardware failures, by type, how often, by device class and unit and address. Vendor personnel performance must also be recorded. Reports can be generated, given such information as failure data on each device, failure trends, best/worst devices within class, etc.

Q: I presume that the same data base can be used for analytical reports.

A: Of course. In fact, we have a software product for reliability support that not only provides the data base of reliability information but can generate reports that permit objective comparisons among vendors' equipment and maintenance personnel. Obviously, such data taken over long periods can help develop local standards of reliability performance but, more important, can help establish industry-level standards of reliability which everyone (except possibly the hardware vendors) agrees are sorely needed.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

Public Needs Helpful Overbooking Figures

The Taylor Report

By
Alan
Taylor
CDP

Eastern Airlines has used its overloaded ratio (passengers rejected/passengers flown) to challenge the other airlines. It has started the next step in the saga of getting the computer decision-making age started properly. I mean "computer decision making" as opposed to merely computerized arithmetic, which is the level of most computer "decisions." Computer decision making, as far as deliberate overbooking systems operate, involves at least one elements of computer-decided number — the forecast of how many seats on a given plane will have been reserved for passengers who won't board the flight. Of course, the rest of the work — the allocatio of "confirmed" seats for flights that are already full — is arithmetic in nature, but the application itself isn't.

The overbooking algorithms have survived through a number of stages. Originally, their very existence was covered up, and "computer errors" were used as the excuse when someone couldn't be boarded.

Then came the second stage. The public was kept in the dark about what was going on, but the regulatory body, the Civil Aeronautics Board (CAB), was fully aware and generally supported industry in withholding information from the public. The "public interest," according to the prevailing attitude in the department, was better served by getting money to the airlines so that they could lower their fares.

I never saw any explanation as to why the public was not told about what was happening, but in the industry the idea seemed to be that the passenger would simply book with another airline that didn't tell him. And, as far as I can make out, that really was, and to some extent still is, the reason why so little is coming out, even now.

Of course, this year the third stage has arrived — the public knows. Under CAB orders, disclosure that deliberate overbooking has been taking place started as simple notices in ticket envelopes.

Now these notices are short essays that disclose what is going on and try to reassure the passenger and rationalize the situation.

Eastern's Scapegoat

Eastern uses a little bit of exaggeration in its rationalization. It claims that "invariably" some people don't take the seats they book. I doubt that very much. There must be some, if not many, occasions when all the booked passengers arrive at the loading gate. I certainly don't mean that many flights are never without no-shows, but to make this "invariable" claim is really no more than to make the "other" passengers into scapegoats.

The airline doesn't mention late planes missing connections, or anything like that. Eastern has quite often made me late for planes and other engagements — and I think the airline's role in no-show should be brought out in any future rationalization.

In the rest of the explanation, it claims that the number of overbookings can be accurately calculated and can be allowed for in flight planning. Then it goes on to claim that Eastern's record (two rejected in 10,000 passengers boarded) is better than that of any other major airline.

Well, I don't know if we are soon going to see an airline "war" of how few denied bookings one carrier can have — rather like the cigarette tar war or the gas mileage wars that have come about with the use of government figures and testing methods. It is possible and is certainly in the cards.

However, I hope some more constructive information will be available first, because figures like "two rejected in 10,000" are simply inadequate. They do not address the question of whether overbooking is worthwhile or not.

The question is how many of the people who were overbooked as the flight prepared to take off (not counting those seated as a result of cancellations) were boarded and how many were not. Inflating the number of passengers affected by adding in the number of passengers carried on flights that had no overbooking; and including the passengers who were boarded, but who might not have been, on the overbooked planes just makes the numbers an apple-and-orange comparison.

However, what really is missing is some idea as to which planes are likely to be overbooked. For instance, is the last plane at night out of Toledo ever overbooked? Even on Christmas Eve?

In fact, there is no doubt that overbooking is a success and that it will continue in many or most cases where it is being used. Efforts to improve the quality of overbooking algorithms are most meritorious, and if the use of figures in publicity helps improve the algorithm quality, then I'm all for it. But I think that the quality of the suffering caused in various cases is what has to be brought out, rather than simply the quantity.

What about it, Eastern? Care to come up with some real innovations to help the sufferers — and to give us statistics on the numbers of people who are really affected by overbooking to compare with the number that you have to refuse?

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Letters to the Editor

Working for a Living

I was very interested in Reed Lawlor's letter ["Cartoonist Needs Debugging," CW, Sept. 19] especially because he didn't like the implication that copyright lawyers "are only interested in the money they can collect for rendering services." This seems like a fairly reasonable description of working for a living — unless, of course, attorneys are now working for the fun of it, or out of a feeling of responsibility to the DP industry, and not for the fees.

While it's true that one can write to the Register of Copyrights, that office is paid (from tax dollars, of course) to help. It is not a law office engaged in earning a living by providing services. To draw a parallel, just because you know where you can get a free book on the causes and cures for medical problems, that doesn't mean doctors aren't interested in their fees.

I've been a DP professional since 1956 and an attorney since 1963 and hence attended the first conference on "The Law of Software" in Washington, D.C., in 1968. Most of the talk (and many of the speakers) concentrated on the fees that could be collected. They stressed that if patents for software were to become a fact, an enormous new field would become available.

I've seen nothing to indicate a change in this attitude. I don't know of anyone who wants to be deprived of income by "do-it-yourself" competition.

This may be one of those not unknown DP situations where a supposed program bug is in fact just bad input data.

Henry F. Herre
San Francisco, Calif.

Surprise, Surprise . . .

Imagine my surprise upon reading Jeff D. Murphy's ringing denunciation of the Certificate in Computer Programming (CCP) examination as a "cliquish vanity" that "makes money for its creators" [CW, Sept. 26], since the Institute for the Certification of Computer Professionals (ICCP) is a nonprofit corporation.

Equally surprising was the statement that there are about 10,000 holders of either a Certificate in Data Processing (CDP) or a CCP, because the very first CCP examination won't be given until the end of October. (There are actually about 16,000 CDP holders.)

I was surprised that Murphy asked how many DP managers consider it important that their programmers be conversant with professional ethics and legal considerations. As a DP manager, I assure you that my programmers had damn well better be!

I was astounded when I read that Murphy thinks the CCP is an attempt to substitute "education attainment for demonstrable ability." After all, the *CCP Announcement and Study Guide* very clearly states: "While no specific educational or experience requirements must be met in order to take the examination, a candidate who does not have extensive experience will find the examination to be extremely difficult."

Then I read the editor's note which said: "Murphy is a marketing manager . . ." and I wasn't surprised.

Bob Brown
Atlanta, Ga.

Vain, Maybe; Cliquish, No

I am responding to Jeff Murphy's Sept. 26 article on "Cliquish Vanity." I am one of the "one half of one percent," according to Murphy's calculations. This slip of his perhaps indicates what he would like to wish for. The fact that he nevertheless took the pain to warn against "the destruction which awaits" him, is an indication that he feels the figure is higher than that.

By coincidence, the same issue of Computerworld contained a front-page article stating that DP salaries were up last year by only 5.1%, an increase lower than the inflation rate. That figure, better than anything else, suggests that the demand for programmers is slowing down. The amorphous mass of people who have been brought into the profession will lead to internal differentiation, as happens in many natural systems.

In the absence of real salary increases, the people who were unable to graduate into management after their third Cobol program (and, as a result, had a chance to learn the distinction between global/local), will seek some measure of their "real ability." To measure this real ability and the productivity of programmers is an extremely difficult job. Few managers can do it and I am not sure that Murphy can. Why not then let the specialized institution do it and tag the people who pass the exam as certified data processors (CDPs), certified computer programmers (CCPs) or whatever.

Vanity? Maybe. But cliquish it is not. The exam is open to anybody, and it gives an outlet for unused energy to the people who take the exam — energy that they otherwise might use to compete for Murphy's position. But they probably don't want to; maybe they want to do a better job for their managers and for their companies.

Henry Pikner
New York, N.Y.

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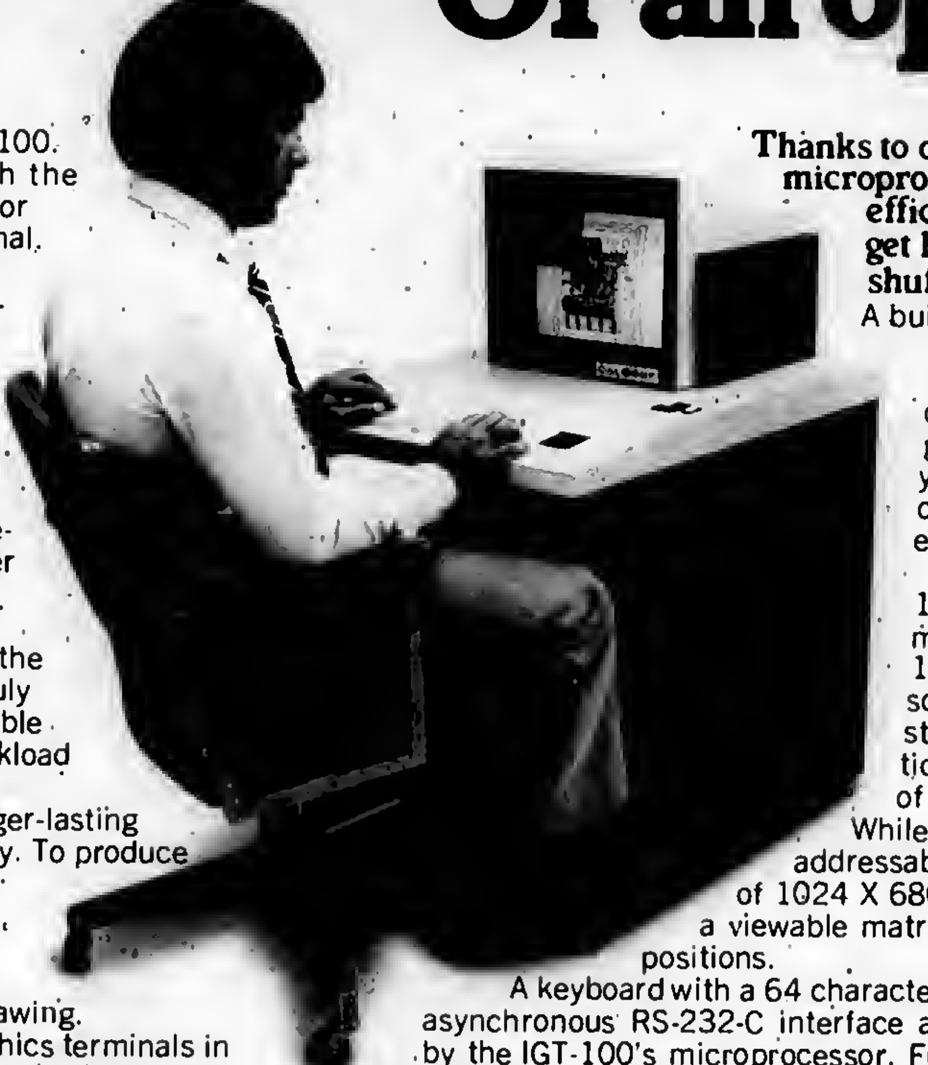

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By contrast, most graphics terminals in the field today (with storage tubes) are about as far from interactive and intelligent as you can get.

Dependent is more like it. Because, typically, every graphic image — and every graphic manipulation — has to be carefully calculated, then transmitted, by the host computer to the waiting graphics terminal.

This whole routine not only puts a tremendous burden on the host computer (which usually has other jobs to do) but routinely requires lots of special software.

With storage tube type terminals, even routine manipulations like panning, zooming, selective erasing and message changing aren't very fast. In fact, the terminal operator is required to wait — up to several minutes — for a previous image to be completely erased and the second image to be tediously redrawn.

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In fact, working with its built-in microprocessor, the IGT-100's longer-lasting raster scan screen will beat a conventional storage tube every time. Delivering a faster, brighter image at a flicker-free rate of 60 frames per second.

And that's a mighty pretty picture — any way you look at it.

Who Cares What an EXCP Costs?

Perfect Chargeout Just Not Obtainable

By Lawrence H. Cooke Jr.
Special to CW

Probably the hottest issue in DP today is chargeout. Users and DP professionals alike have discovered the cost of data processing is like other costs of doing business, such as advertising or buying raw materials. They have found that expenses decrease the bottom line, while revenues increase it.

Well, it was a long time coming. Still, even today, vestiges of mumbo-jumbo cloud reason. The DP professional knows exactly how to charge for services — one simply pays so much per EXCP, for working set occupancy, for disk I/O, and costs are equitably distributed. But that doesn't work anymore.

The objective of this article is not to account for the lash on the gnat's eyebrow; we aim at a more modest and, we hope, more useful target. We propose to show why chargeout schemes have generally failed to satisfy their objectives and to offer a course that should satisfy all hut the most fanatical.

To enumerate them quickly, some of the more important objectives of chargeout methods are cost recovery, predictability, understandability, fairness, replicability, efficiency, charge for demurrage (a storage charge for items that inconvenience others by tying up disk, tape, etc.), minimum interference, auditability, priority, cost competitiveness, marketability, rate stability and off-peak economy.

Reader Commentary

Further objectives of some chargeout mechanisms permit extendability to larger computers without changing rates and encourage migration to favored techniques such as data base or interactive systems, all through pricing.

Some methods seek prices that are robust, meaning that a small change in input should not cause a large change in price. Some chargeout systems seek to punish memory hogs or, heaven forbid, card users.

In short, chargeout may be used as a social tool to encourage some practices and discourage others, without regard to actual costs.

The Basics

Putting aside some of the more precious objectives for the moment, most users and DP people would settle for agreement on a few of these ohjectives. First, prices should exactly recoup costs:

$$(1) \quad P = C$$

Next, prices should be related to volume and to the user's terminology:

$$(2) \quad P = nX$$

where n is volume and X is the unit of account (for example, transactions, clients, accounts or other quantifiable units known to the user).

Third, costs should be identifiable per unit, i.e.:

$$C = /X = (c_1 + c_2 + \ldots + c_k) / \text{ OR.}$$

$$(3) \quad \frac{C}{X} = c_1 + c_2 + \ldots + c_k$$

where C1 are the units of the chargeout, such as CPU time, etc.

Fourth, costs in time 1 should equal costs in time 2, 3, etc.:

$$(4) \quad C_{t_1} nX = C_{t_2} nX = C_{t_r} nX.$$

The volume held constant, each time the job runs it should cost the same.

In summary, prices should recoup costs, prices should he related to units the user understands, costs should he related to the expense of providing services and the costs should remain constant if volume remains constant.

The Paradox

This seemingly simple set of requirements cannot be met because all of these conditions cannot obtain simultaneously. If three of these conditions can be met, the fourth must be false.

The simple paradox of chargeout is that some of these conditions are mutually exclusive. This fact of nature has eluded some of our best minds; they feel that if they can introduce finer levels of detail, they will approach the perfect chargeout.

With today's computers, features such as virtual memory, multiprocessing and automatic error recovery make it impossible to determine costs in a variable mix. There is an error term in equation (3) above that defies measurement.

In a mathematical sense, there are more variables than equations, so a solution is indeterminate. In an Intuitive sense, there's more going on than can be measured.

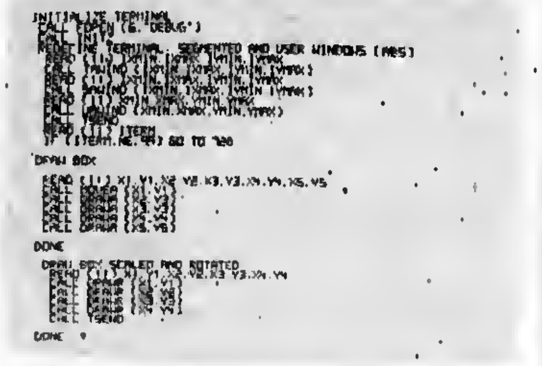
A short illustration may be useful. Three users, A, B and C, share a computer facility. They wish to be charged fairly, but they don't know or care who else is running.

They are indifferent to the presence or absence of others, so long as

(Continued on Page 28)

ed graphics terminal
computer's power.
or's patience.

Six images that warrant some serious comparison shopping.
A quick look at basic viewing capabilities and you'll soon discover there's not a more versatile graphics terminal around than the CalComp IGT-100.



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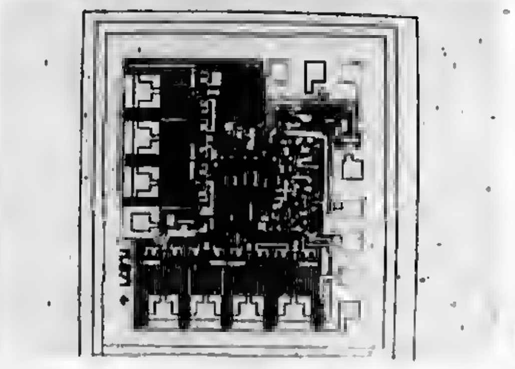

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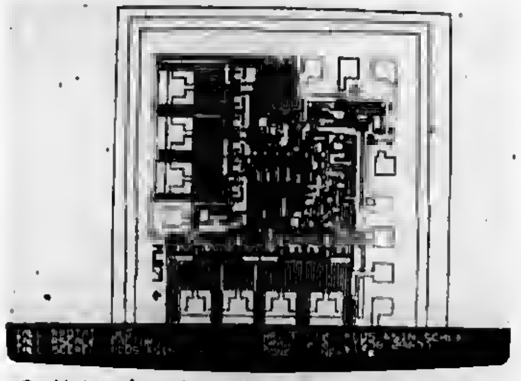
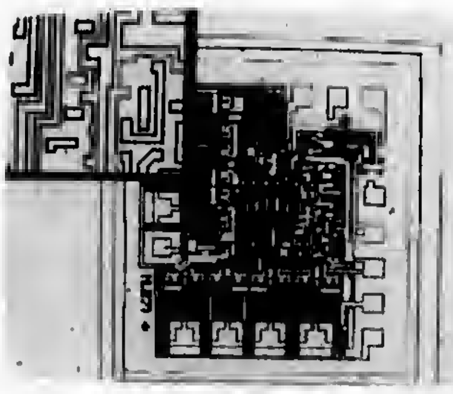
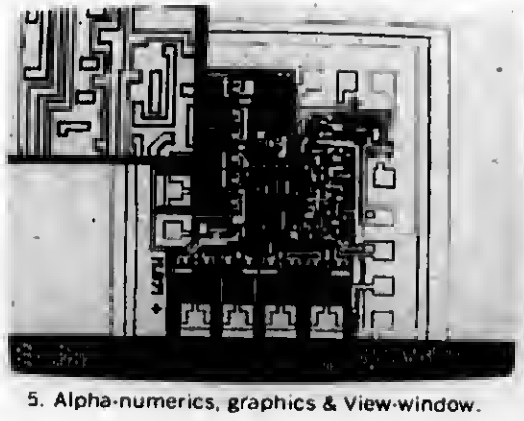


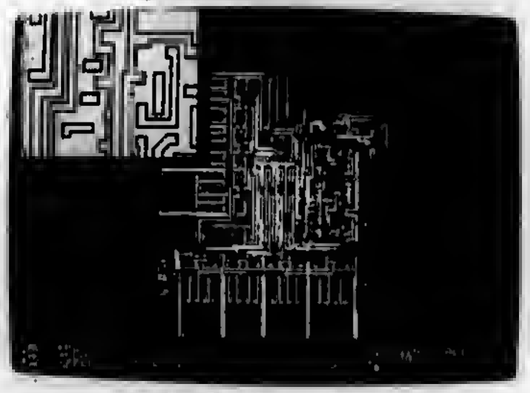
3: Alpha-numerics & graphics.



4. Graphics & View-window.



5. Alpha-numerics, graphics & View-window.



6. Alpha-numerics, Graphics & View-window (with reversed-out section).

To begin with, the IGT-100's special three-way, split-screen design provides you with separate alphanumeric, graphics and view-window sections.

Plus the ability to independently view and control (i.e. panning, zooming, etc.) one or a combination of these sections simultaneously.

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The IGT-100's basic screen design maximizes the amount of data that can be displayed while providing you with six basic screen arrangements. Annoying superimposed messages have been totally eliminated.

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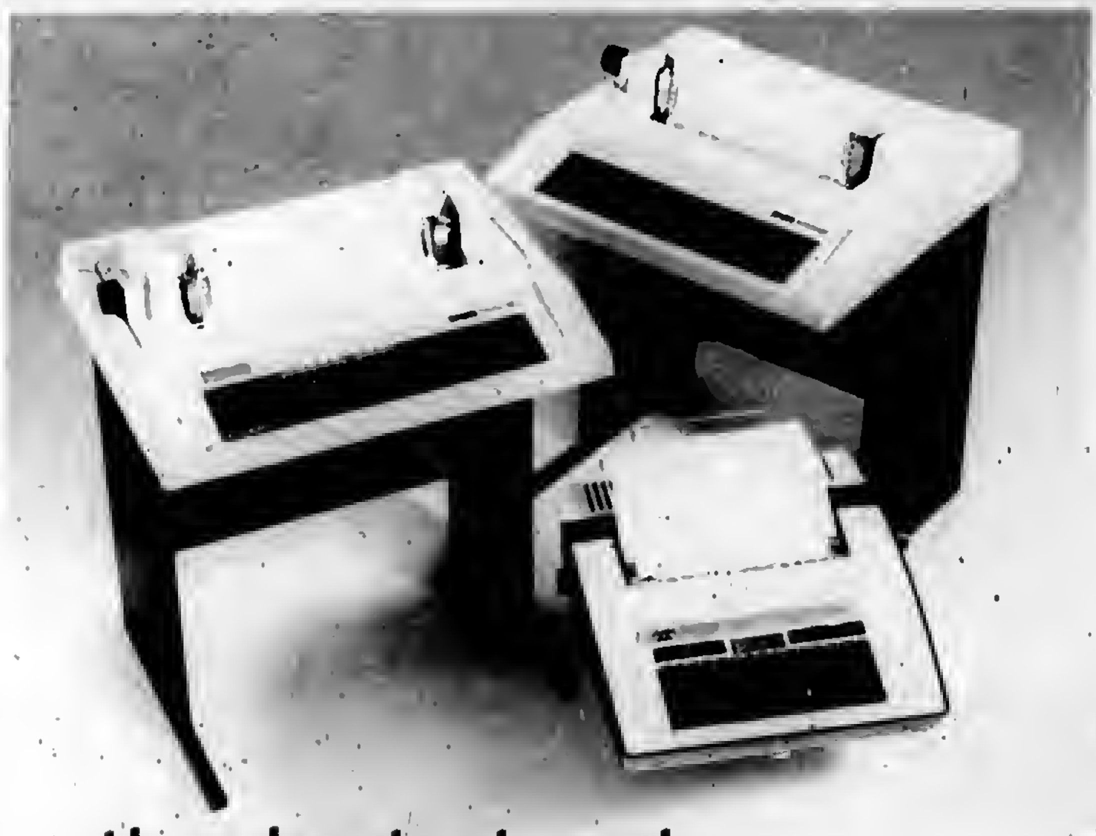

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6	A	B		2.8	any two running
7		B	C	2.7	
8	A		C	2.1	

This table shows the variables involved in a chargeout scheme when three users share a computer facility.

Perfect Chargeout Unreal

(Continued from Page 27)

the price each pays is fair and constant. The above table shows the variables in this simple example. With three users, there are $3^2 = 8$ possibilities.

Some will look at the table and say the condition is impossible. Certain operating systems report to the user that the time expended or charged to him is relatively more constant than it actually is, so the real cost is buried somewhere in the bowels of the computer.

The explanation of cases 6, 7 and 8 is fairly simple: A and B contend for CPU, B and C contend for I/O and A and C are fairly well balanced. Paging occurs, contention occurs; and someone must pay for this overhead when it occurs.

The question is, to be fair, who should be charged what?

Enlightenment begins by not trying to be smarter than we are. We can't predict costs exactly because we don't know what they are. Multiprogramming, virtual storage, error recovery and operating software internal routines have removed the certainty from computers in what they are up to in their nanoseconds.

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Computers are approaching this capacity in a primitive way, and the point here is that the cost of bypassing any aberration is unpredictable. The physical environment within which the problem program runs is constantly changing

Nonetheless, if a perfect chargeout is unattainable, a reasonable one is very much in reach.

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(Continued on Page 30)

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Battered by Changes, Users Now Full Circle

By Jim Ryan
Special to CW

Many years ago, computer systems were so expensive that they were used only by large corporations. Within these corporations the computer user was often a department head; when the corporation decided to investigate the possibilities of computer systems, he called IBM and a very interesting conversation usually occurred.

It went something like this: "!!#$%!! It's simple."

If the potential user didn't become discouraged, he gradually learned about such things as source documents, fields, keypunch cards, calculators, wired boards and printers.

But the user also found the computer wasn't the genius he had believed it to be. The key was in the source documents and wiring of the boards.

The user also found that when he understood the system, he was in command, which was a nice feeling.

The computer systems were all in-house initially and the department heads, usually in accounting, felt quite happy with this arrangement.

One day an engineering department head heard about the possibilities of computer systems as mathematical tools.

The engineer went to IBM and the same initial conversation took place. The engineer persisted, however, until one day accounting saw the engineering department processing punched cards, using its own wiring boards, in the computer room.

Accounting did not object until the time arrived when it couldn't get its job done because engineering was processing its job.

Then organization protocol set in, and it became necessary for all departments to process their potential jobs through the accounting department for scheduling.

The first blow to the previously freewheeling user had fallen. The next blow came when a computer department was set up. All departments, including accounting, now had to process their jobs through the computer department, not only for scheduling but also for programming and keypunching.

They were, effectively, locked out of the computer room.

Soon the user's conversation with the computer department resembled his original conversation with IBM. He had two alternatives: to put complete faith in the computer department and hope that all would be well or to update his knowledge of computer systems so he could communicate with the computer department.

In the meantime, technology had moved forward with great strides; solid-state was in and wired boards were out. Most computer systems continued to remain in-house and, for a while, physically transporting source documents or keypunched cards was the "in" thing. Specially prepared storage files were designed for the cards which must not be folded, multilated or spindled.

Before long, however, the user confronted another dilemma as he began to hear more strange languages coming from the computer room. Undaunted, he ultimately translated these languages into words like Fortran, Cobol, hardware, software and peripherals, plus a myriad of other goodies.

The user conquered these terms because computer systems had become a must in any well-run, high-prestige organization.

The computer systems people found some of the users actually understood their jargon, so they moved on to further adventures in science and languages.

The user, reading some of this stuff for the first time, saw not only the familiar "!#%&" but it was followed by (XXX). Once the "!#$%&" had been identified as (XXX), the computer systems experts glibly proceeded to use only the acronyms which they had invented for the occasion.

Reader Commentary

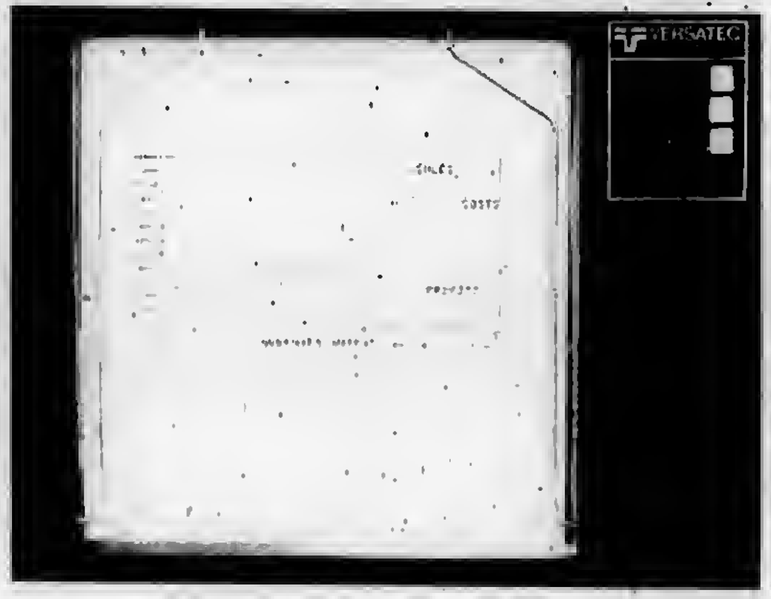
Many users succumbed to the pressure about this time, and their plight is illustrated by the story of the systems operator who said at the climax of a presentation to the user, "I can deliver a report to you every five minutes." To which the user groggily replied, "I'll wait for the next one."

Just as the remaining users were about to give up in despair, technology came to the rescue by bringing the cost of storage and processing down so low the user could sneak into the act again.

The brave user who had survived the flood of languages and protocols found he could access a computer for limited amounts of storage and processing if he obtained a user number and followed the proper protocol.

He could even write, debug, process and obtain printouts of his jobs if he took the time to learn com-

(Continued on Poge 30)



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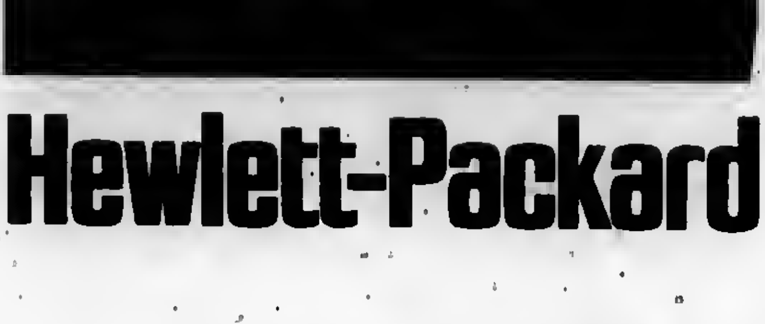
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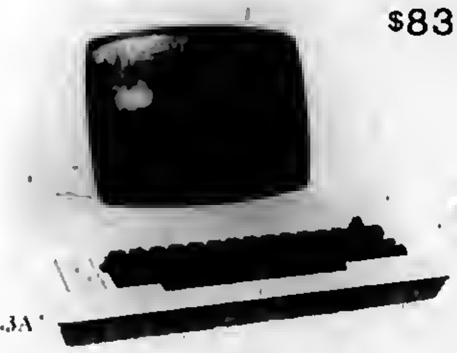

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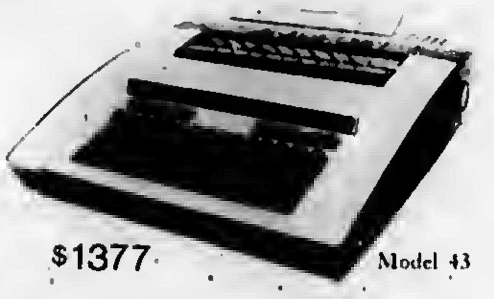

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Users Now Full Circle

(Continued from Page 29)

puter languages.

The user had now completed the circle back to his original position. He still had to contend with queuing, priorities and scheduling, but he felt more comfortable because he had regained some control.

This condition prevailed for some time until one day a curious user heard about a computer system which contained all of the features of the large computer, but on a much smaller scale.

Suddenly the user had more options than he knew how to evaluate. If he survived the past, he could do his own thing with his own computer or he could obtain a user number on a large computer or he could give the job to a vendor who hopefully would solve all of his problems or any combination of the above.

The user was now in danger of being in the same dilemma as the wife who calls the doctor because her husband is sick. The doctor arrives and prescribes pills to be taken every four hours. He returns the next day, examines the patient and says he is improving.

This process continues for five days and the doctor continues to report improvement. On the sixth day, the patient dies. When the widow is asked the cause of her husband's death, she replies, "Improvements."

Ryan is a retired DP manager.

Real Chargeout Only Illusion

(Continued from Page 28)

problem with fair pricing. To internal users, a fair price is a low one. DP shops which sell their services operate with a market price which is governed by competition. Internal DP shops would do well to move up to a market price as well.

Prices and costs are not the same thing. Costs can be approximated more exactly by more careful measurement techniques. A one-parameter cost measure may capture 80% of the user variance in the use of facilities, a two- or three-parameter measure 90% to 95%; and a 100-parameter measure won't do much better than a three-parameter measure.

After a while, the cost of accumulating and analyzing the information exceeds the amount of the variance.

The same is true on the price side. If a one-parameter model, such as $1 per transaction, is too simplistic, then a fixed charge plus a transaction cost or a two- or three-variable price may be appropriate.

A fair price is one users are willing to pay. If it is based upon understandable cost information and it is in line with general market prices, there will be no difficulty in gaining acceptance.

If a price is too high and users are unwilling to accept it, the market mechanism will ensure that the service will be replaced by a more efficient one that gives the user what he needs and wants.

A reasonable chargeout system doesn't try to price costs exactly, because costs cannot be determined exactly. Prices should be generally related to costs and should be generally replicable, based upon units the user understands.

If costs are not recovered exactly one year after the dust has settled, prices should be increased the next.

The perfect chargeouts are not only unobtainable, they are nonsensical. Who cares what an EXCP costs?

Let's settle for a reasonable charge for services and get on with the work of solving the user's problems.

Cooke is manager of systems and programming for Midatlantic National Bank, West Orange, N.J.

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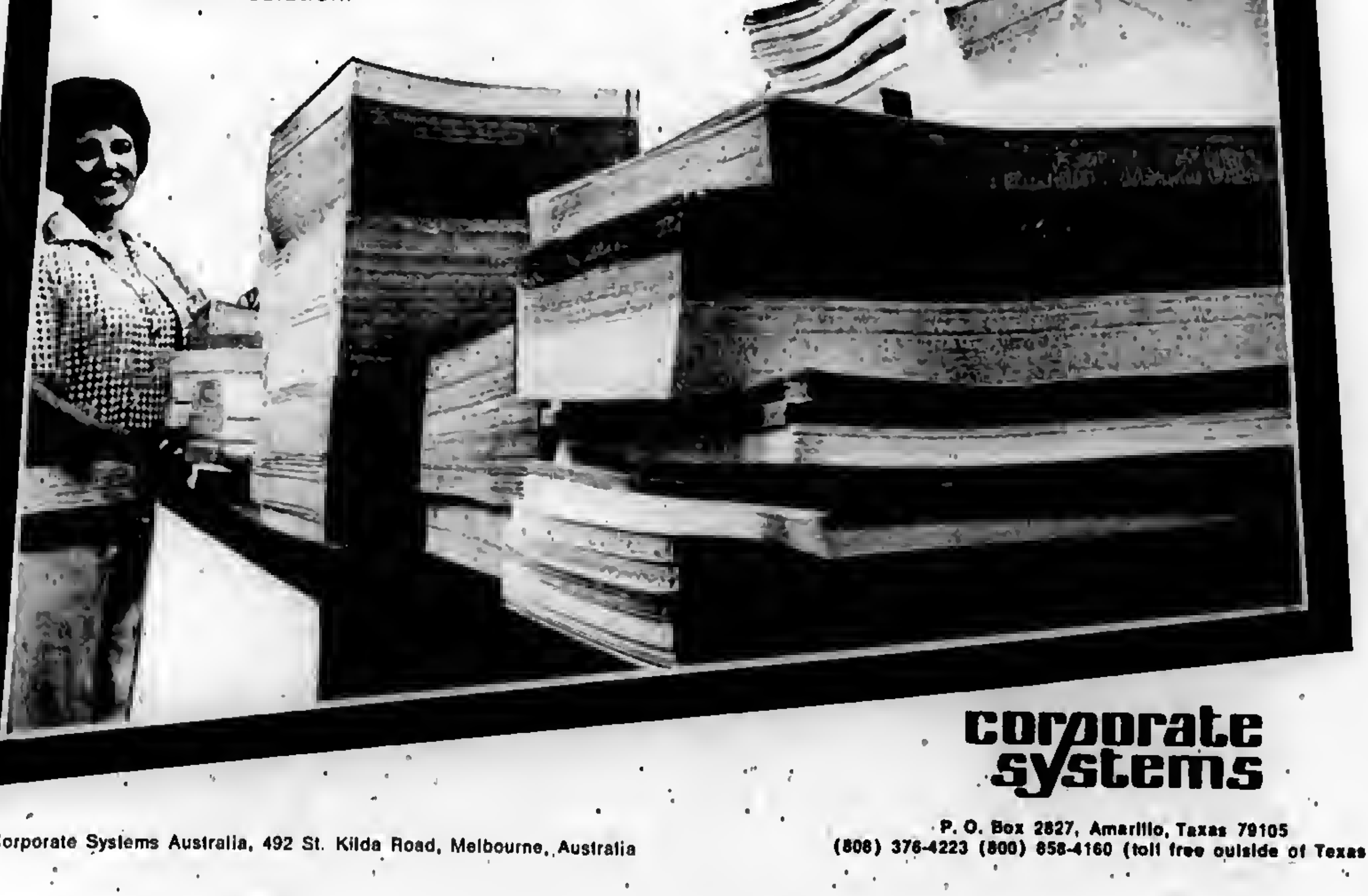

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Licensing: The Issue That Still Won't Die

By Kenniston W. Lord Jr.
Special to CW

Three years ago the name of Ken Lord was launched into national notoriety by the filing of the nation's first data processing licensing bill. Perhaps now is the time to take a retrospective and and dispassionate look at what it was, what it was intended to be, why it happened, where it's likely to go and why.

As the title given by *Computerworld* to this column would indicate, its author had gained a reputation for seeking a battle. That was absolutely true — with the emphasis on "was."

In truth, the filing of the licensing bill was the culmination of a long list of events carefully planned and calculated to launch me into the public spotlight, a process begun in 1969. Why was such a process begun?

It was the offshoot of employer pressure for me to gain credentials. I gained my Certificate in Data Processing (CDP) the same year and my college degree the following year. But like other "personal objectives" detailed over the years, their realization did not bring fulfillment.

The licensing issue was somehow different. What began in 1973 as a means to elevate Ken Lord quickly became a worthy passion, for I began to believe those things which I had written and spoken.

By the time the bill was finally filed in Massachusetts, I was convinced that there was a problem and that licensing was a means of addressing the problem. I am no less convinced today.

Despite the fact that I stopped speaking to the issue in 1975 (there was a strong personal, professional and economic backlash), it's somewhat rewarding to know that the discussion continues, as readers of recent issues of CW can attest.

For three years we have read and written defenses of both — if not all — sides of the question. And here we sit three years later, having accomplished little, if any, forward progress in addressing the issue — the right of the public to be protected from those of us who would work to its disadvantage.

If it were a simple issue, that would be one thing. But there are ancillary issues which make it something else entirely.

In truth, we're talking about a fabric of protection and prevention, not just a single aspect — licensing or certification. Included in such discussions are elements of privacy, consumerism, "professionalism," propriety, standards, education and, most certainly, elements of humanity.

The time is past for "war stories" of how computer people, with their patented insensitivity to humanity, have disadvantaged that humanity. No longer is it really valid to detail how the consumer has been folded, spindled and mutilated.

Those items have been well documented and commented upon. Nothing new under the sun remains to be discovered in this area. But that does not mean that such practices will not continue. Most certainly they will — until the DP community or legislative bodies take some appropriate action.

The licensing bill filed by the Society of Certified Data Processors (SCDP) upon my insistence was a device necessary to call attention to what we felt was the real issue at that time — standards.

Standards of practice, education and performance continue to escape us after more than a quarter century. Standards of ethics continue to be discussed and ignored. Standards of privacy will gradually emerge, although more despite us than because of us.

Standards for systems design will gradually emerge, but we will suffer the loss of much blood and prestige before that happens. Standards of certification may also emerge if the Institute for Certification of Computer Professionals (ICCP) can merely set aside the proprietal interests of its constituent bodies.

. . . And in This Corner

In my upcoming columns, I shall present one plan for addressing the issue in its entirety, or at least the entirety as I see it. We'll look at what has transpired in the three years since licensing became the topic of discussion. We'll look at both licensing and certification, to see if we can draw a clear distinction between them and show how, when and why they can work together.

I don't guess that old Ken is any less a combatant than before. A leopard cannot change his spots.

But what he can do is tender some positive recommendations which engender rational discussion among the thinking people of this industry, for it would seem that a three-year-old issue which refuses to die must have some merit, if only to clearly demonstrate that a critical issue remains to be resolved. Perhaps among us we can find some answers.

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Reader Commentary

Bill Creates Federal Standards Body

Passage of S. 825 Will 'Lock Up' Technology

By David C. Abbe
Special to CW

On March, 1, the *Congressional Record* reported a bill, S. 825, submitted by Sen. James Abourezk and coauthored by Senators Birch Bayh and Hubert Humphrey. The basic purpose of this bill [CW, July 11] is to create a government role in the regulation of all private, nonprofit standards committees.

The government would "offer" federal funding of such committees to "improve" the basic standardization activity by including representation on these committees of consumer groups, testing services, etc. This funding would also be used to "expand" domestic standardization efforts.

Therefore, under the direction of the Federal Trade Commission (FTC), a new department will be established within the National Bureau of Standards. It will be called the Institute of Standards and Accreditation and will "develop the resources; facilities and expertise necessary" to "develop a uniform national standardization process."

The impact would be that any private, nonprofit organization which sponsors standards development would be subject to direct FTC regulation. The composition of the committee membership would be changed and formal appeals procedures required.

In the event any standards group failed to adhere to federal rules, the government would step in and replace it.

The bill's authors argue that this is necessary because, some past standards have violated the intent of antitrust regulations.

It is clear to me that this is creating a federal program to socialize the control of industrial technology in the private sector. The political history of the bill's authors gives further support to such a concern.

I believe that it is in the best interest of the American public and our free enterprise system, which includes many good self-regulating standardization efforts, to oppose this bill in its entirety.

If we allow the federal government to "lock up" our technology in fixed standards and standardization formats, it could have a serious impact on our industrial productivity, balance of trade and general economy.

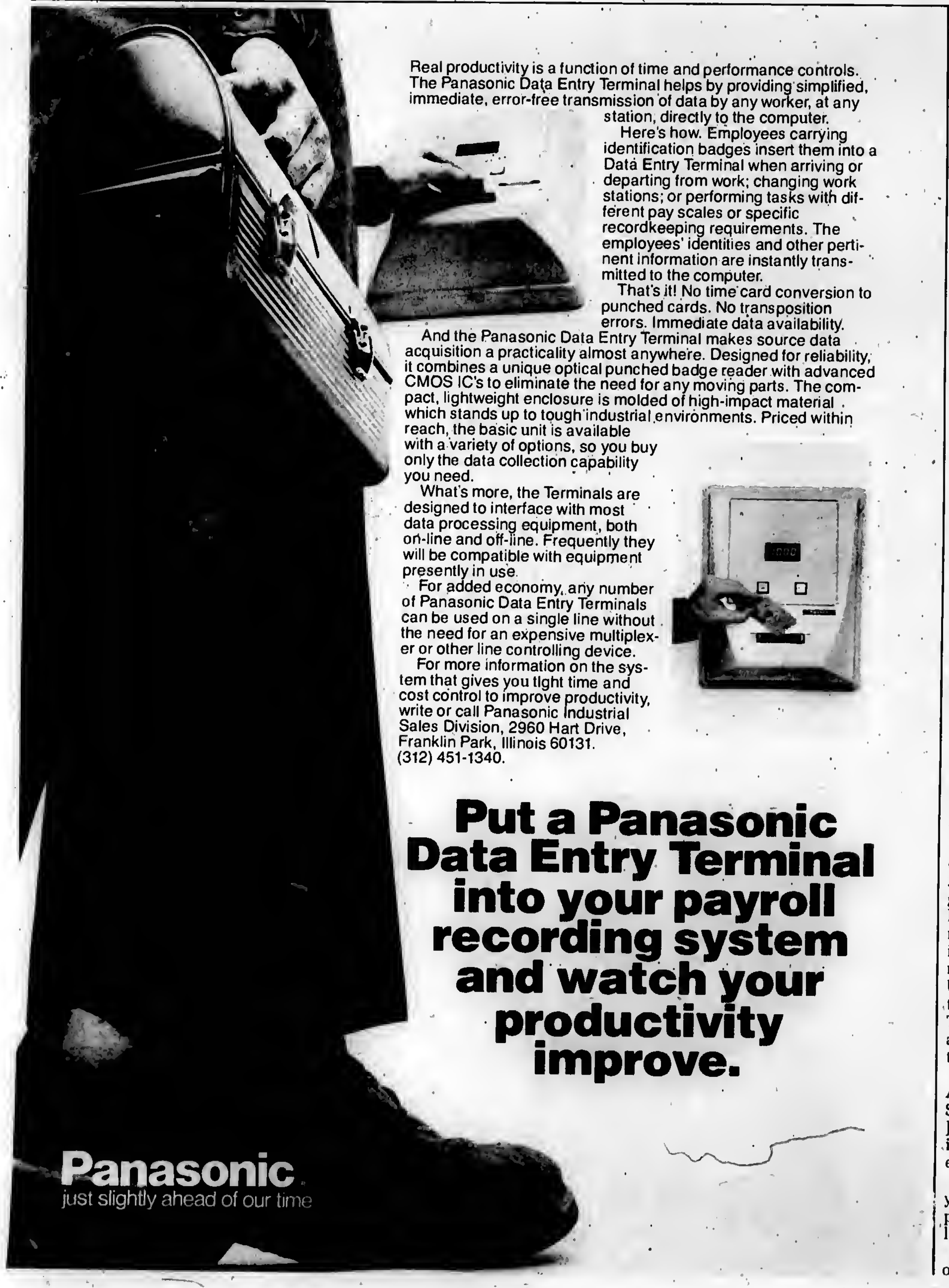
The American involvement in international standards would also be seriously abridged, as the international standards organizations could hardly be expected to stand still for federally mandated U.S. positions.

Over the past decade, federal spending for R&D has continued to decline in favor of more spending on nonproductive programs intended to improve the "welfare" of the least productive sectors of the American public. To fill this gap, private industry has had to increase its commitment (with no particular tax incentives) to new development works in order for the U.S. to retain a leading position in world technology. This bill is a great danger to any reasonable continuation of these private efforts.

S. 825 is presently in the Antitrust and Monopoly Subcommittee of the Senate Judiciary Committee. No immediate House action is expected.

There is still time to write your senator and voice opposition to this dangerous legislation.

Abbe is product manager of Ade Corp. in San Diego.



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With Remote Processing

Service Caters to Insurance Group Needs

ATLANTA — While most remote computing services have capabilities for a broad range of users and avoid catering to the needs of any particular user group, there are exceptions. The Home State Insurance Companies of the Berkshire-Hathaway group, for example, are taking advantage of a processing service for property-casualty companies.

The five companies in the group are widely scattered across the midwestern U.S. They include Cornhusker Casualty in Kansas, Lakeland Fire and Casualty in Minnesota, Texas United, Insurance Company of Iowa, and Kansas Fire and Casualty.

The service is provided by Insurance Systems of America (ISA) from its data center here. Under the service arrangement, the group will have the use of modern equipment and software geared to its needs, without the heavy expenses of a large computer and a DP staff.

The parent corporation has been providing DP services for the companies since their inception. While these services were adequate, management felt that future growth would require more sophisticated systems.

Then, however, the group faced a dilemma that is all too familiar for small-to-medium-size companies: How could it achieve the improved efficiency, control and customer service that automation offers — without incurring the high costs of hardware, software and a qualified technical staff?

According to Larry Steen, systems manager for the group, the processing dilemma appeared to have no satisfactory solution. "One option was to do nothing — but that was contrary to our concept of providing responsive, local service at a reasonable cost. Buying our own computer and software and hiring experienced technicians was cost-prohibitive. A third alternative was to convert our parent company's systems for our needs, but this approach proved to be much more difficult than we expected."

Hookup Option

Then, early this year, Steen discovered a new option: Use a teleprocessing hookup with ISA's data center, where software could be maintained to fit the needs of the Home State Companies.

"The service approach has significant advantages," Steen said. "We don't have to buy a large computer, hunt for technical people with insurance experience or develop our own system. ISA has computer facilities, proven software and experienced people. The processing service will give us the benefits of better software than we could achieve on our own — and on a much more economical basis."

Each company will have a 48K Data General Corp. Nova 3/D minicomputer for preliminary processing of policies, claims, premiums, billings and corporate accounting data. This data will then be transmitted to ISA's 2M-byte 360/65 running with Itel software supporting 370 facilities such as Vsam.

There, two software systems will take over: "V-4," an on-line casualty processing system; and the ISA/Accounting, Budget and Cost System. Results from these two systems will be transmitted daily to the minicomputers in Omaha, Minneapolis, San Antonio, W. Des Moines and Topeka.

GIS/VS Optimizes Productivity In Various Programming Tasks

WHITE PLAINS, N.Y. — Version 1, Release 1.1 of the Generalized Information System/Virtual Storage (GIS/VS), announced recently by IBM, was designed to support a variety of information processing activities with facilities for defining and processing OS/VS data files and DL/1 data bases.

Particularly useful to programmers and analysts as a programming productivity tool, according to IBM, GIS/VS can also be used as a query facility, as a report generator or as a production reporting system.

GIS/VS V1 R1.1 is said to include three installation management exits that allow insertion of user routines for accounting and control. On a more detailed level, it provides automatic decimal alignment of numeric data in GIS/VS procedures as well as limited phrase substitution for GIS/VS procedural language statements.

This update also includes support, through IMS/VS, of the IBM 3790 communication system when in 3270 data stream compatibility mode. It will also support the 3767 communication terminal and 3770 data communication system, a spokesman said, adding that the software also supports the IBM 3800 printing subsystem.

While GIS/VS incorporates a basic query capability, an extra cost option, provides the user with a means of operating with IMS/-VS. The combination of GIS/VS and the data base management system provides more power and flexibility than is available if they were used separately, the spokesman claimed.

GIS/VS is supported by OS/VS1 and by both the SVS and MVS versions of OS/VS2 or wth OS/VS1 or OS/VS2 under the Virtual Machine Facility (VM/370), as well as under IBM's Time Sharing Option (TSO), he said.

The basic GIS/VS is available for a monthly license fee of $907. The Advanced Query feature costs an additional $283/mo and two other features, Update/Create and Modify, are available for monthly license fees of $595 and $141 respectively.

IMS Users Get 'UCC-41' Aid

DALLAS — A data base space utilization program from University Computing Co., UCC-41 is designed to run on all versions of IBM's Information Management System (IMS), according to a spokesman.

The software is said to provide "a new dimension of detail" in determining effective space utilization in IMS operations. The package will aid the data base administrator in recognizing the appropriate time for data base reorganization, he said.

It also highlights the need for additional direct access extents and volumes as well as the need to change DBGEN parameters for improved use of direct-access space and processing efficiency, the spokesman noted. In addition, UCC-41 details the current status of free and occupied space with the data base.

Latest in a series of "System Aid" packages that UCC said can practically be installed by mail, UCC-41 requires no changes in IMS or additional JCL. It can be fully installed after two assemblies — the source code in Assembler — and a link edit.

UCC-41 examines physical or logical data bases of Hierarchical Direct (HDAM or Hidam) organization that are stored in either Osam or Vsam, according to the spokesman. The program can optionally analyze multiple data bases in one execution and supports secondary data set groups, he added.

The program calculates statistics on Free Space Elements, Root Anchor Points and Occupied Space, and produces reports in any of four optional levels of detail. The user's manual includes typical case problems, report analyses and recommended alternatives for improvement, he said.

The packages can be ordered for $3,200 from UCC, 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

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Modular Package Aids Manufacturing Control

NEW YORK — The modular Manufacturing Systems I (MS/I) package from Synectics Data Systems Ltd. (SDS) is a total production system to help the smaller manufacturing organization control operations from an ICL 220, a Singer System Ten or a Data General minicomputer.

With the system in place, a user should have enough information to meet delivery dates, plan manufacturing purchases and minimize stock holdings, he said. The ability to minimize work in progress, measure manufacturing costs and quantify cost changes before taking action is also built into the package, according to a spokesman.

Intended for vendors with up to 20,000 parts, MS/I includes five modules. The Bill of Materials Processor provides on-line maintenance of basic manufacturing information concerning parts, components and operations.

The Inventory Control subsystem handles on-line recording of stock movements as well as inquiries, analysis reports and stock valuations. Standard and "what if" costing, provided by a third module, includes calculation of standard and current production costs.

That module also supports on-line updating of current costs and the immediate testing of the effect of cost changes, the spokesman noted.

MS/I provides two alternative modules for material requirements planning (MRP).

A documentation module rounds out the base package. This produces trial packing lists checking stock availability.

Developed by Safe Computing in the UK, MS/I requires 40K memory and is available in this country for $24,700 or $988/mo for three years, plus installation support costs of up to $8,000.

Individual modules are available separately, except in cases of interdependency, for from $8,300 for the Bill of Material Processor to $2,700 for Documentation, the spokesman added from SDS's offices at 166 E. 34th St., New York, N.Y. 10016.

San Francisco Seminars Set Focus on Program Testing

SAN FRANCISCO — Two-day tutorials on the concepts and techniques underlying effective testing of computer programs will be presented here in San Francisco every other month during 1978. The sessions were designed to help both management and technical personnel, according to Dr. Edward F. Miller Jr., who will serve as instructor.

Presented by Software Research Associates, the seminars will be held in mid-January, early March, mid-May, July, September and November. In addition to San Francisco, the tutorial will probably be given in other cities in the U.S. and abroad, Miller noted.

Five major subjects will be covered in the sessions. A segment on the philosophy of testing — including motivating forces, testing principles, an overview of methodology and preparation, will be followed by a discussion of the theoretical foundations, which provides general principles, graph theory, program behavior modeling and combinatorics.

The third area, tools and techniques, also starts with general principles, then considers static testing, dynamic testing, systematic methodologies and test data generation. Along with its general principles, planning and measurement, the next segment focuses on test structuring, according to Miller.

The wind-up topic — Management and Control — details the economics of testing and test status monitoring, he said.

That is a tremendous burden, he admitted. On the other hand, failure to test or inadequate and incomplete testing can have an adverse effect on the quality of a delivered software sytsem, he pointed out.

The program testing tutorial registration fee is $395, which covers attendance and a detailed notebook including a bibliography, a topical cross-reference, technical summaries of papers and other related documents.

More information is available from Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

Cassette Course For Supervisors

FLUSHING, N.Y. — The Supervisor Development Program, an audio-cassette based training course from Meadows Communications, consists of four major units: the role of the supervisor, communications, human relations and leadership techniques.

Topics discussed in the course include the nature of supervision, the role of the team, setting realistic objectives, the importance of listening, elements of Transactional Analysis and "selling your ideas up and down the organization."

The program costs $55 per set and can be ordered from Meadows through P.O. Box 447, Flushing, N.Y. 11365.

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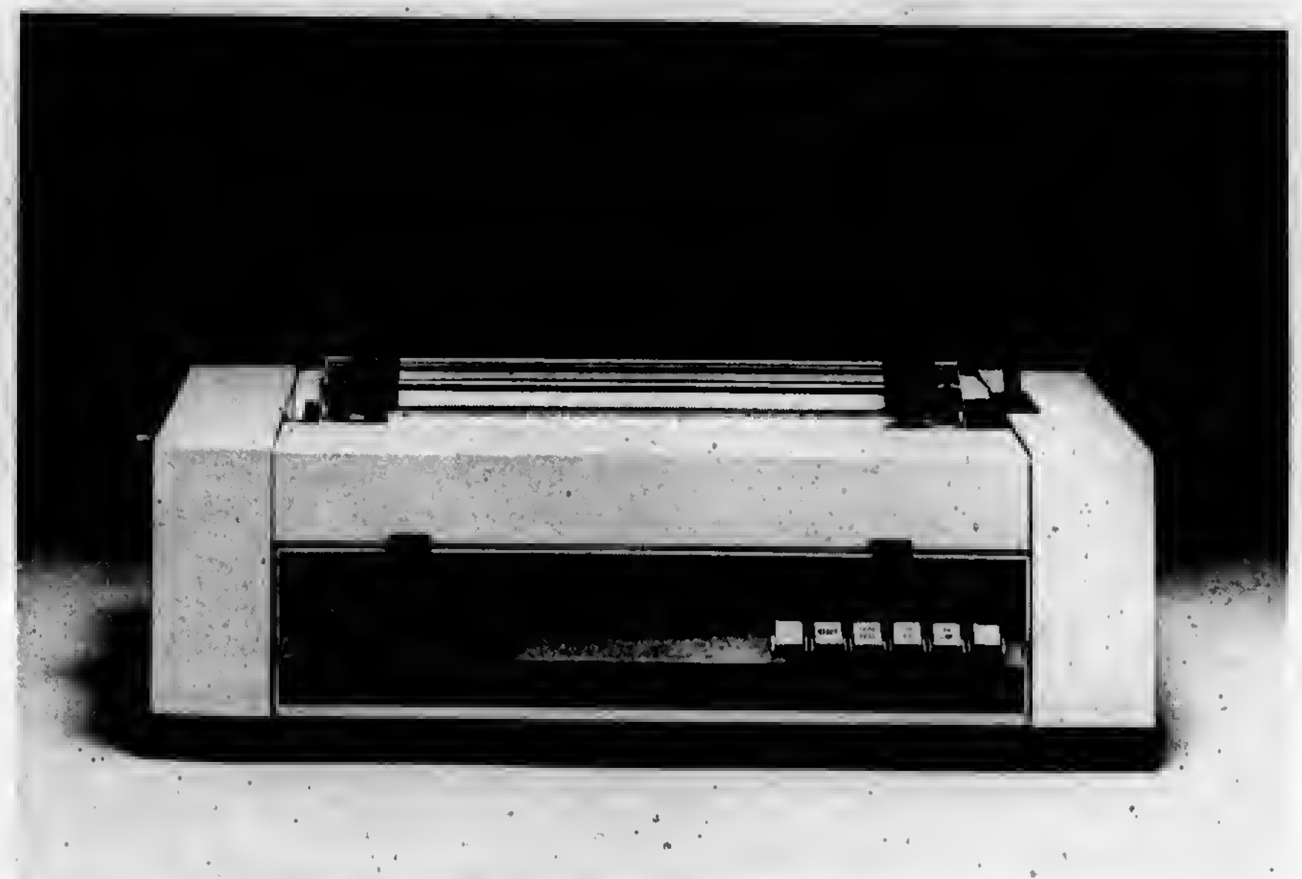

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Special to CW

CHICAGO — Zimmerman Brush has a broad product line, a national distribution network — and a computer system that helps gear production and inventories to current market demand.

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The Xerox Computer Services Interactive Accounting System (IAS) used by Zimmerman Brush handles many details of the financial side of the business. It prices the sales order, creates the customer invoices, updates the receivables and payables, produces the payroll, posts to the general ledger, and pinpoints cost and profit performance all along the line.

However, its role goes well beyond conventional accounting functions into almost every facet of day-to-day operations, from planning materials requirements to controlling production schedules, according to Zimmerman.

A major contribution of the system, he said, is maintaining the delicate and important balance between raw materials and finished goods inventories, on the one hand, and customer service level on the other.

Company officials claim TAS has become inseparable from the service function. It gets into the act from the beginning, with the arrival of distributor and jobber orders which come in by mail and phone at an average rate of 250 a day. Line item totals called for by the daily incoming order flow often reach into the thousands.

Prior to installing the Xerox system, Zimmerman personnel would hand-carry the daily sales orders to a local batch-processing service bureau, where they were keypunched and printed overnight. If a rush order was required, the Zimmerman staff would either wait while the order was processed or make a return trip later to pick it up. Now, orders are entered on-line via an interactive terminal. According to Dave Worley, Zimmerman's director of systems, "If the order is in here by 11:00 a.m., we'll have it picked, packed and on its way that afternoon, assuring the customer of the fastest possible delivery. And the order invoice will go out that evening, assuring us of a faster cash flow."

Another aspect of the system involves material requirements planning (MRP). As it commits finished goods' inventory to fill incoming customer orders, the system continually compares remaining stock balances against preset minimum levels. These are established item-by-item based on a forecast of demand that is updated every four weeks. Whenever a finished product item falls below its minimum level, the computer triggers a suggested production order to initiate stock replenishment to the desired level.

"What we have now is a closely monitored, continually adjusted material requirements planning cycle," Zimmerman said.

"We have been giving customers the brush for years, in a way that has kept them happy and kept us growing. With the computer at our fingertips, supporting routine operations and responding to the exception situations, there is no reason we cannot continue to keep customers happy and keep the company growing profitably," he concluded.

'Qwick Qwery' Eases Access

ARLINGTON, Va. — A simplified means of getting information from demographic, economic or corporate data bases without programming has been introduced by CACI, Inc. This generalized report writing system, called Qwick Qwery, is available exclusively on General Electrics' Mark III remote computing service.

The system is said to be unique in its ability to access several public and proprietary data bases that CACI maintains and that previously were usable only after programming. But Qwick Qwery can also be used to work with corporate records such as personnel, financial or inventory files, a spokesman noted.

To retrieve information and format reports from their terminals, Qwick Qwery users define categories of information in a data "dictionary," according to their own specifications.

Further information on the use of Qwick Qwery or the CACI data bases is available from CACI, Ft. Myer Drive, Arlington, Va.

4C Compiler Adapts Code

LOMITA, Calif. — A CMS/2 compiler that allows the U.S. Navy specialized programming language to run on Rolm Corp. minicomputers and on the Data General Corp. Nova has been introduced by Command Control and Communications Corp. (4C).

Written in ANS Fortran, the compiler allows companies developing programs for Navy Univac AN/UYK-20 systems to use Rolm, Nova or IBM 360/370 CPUs as host machines. The mini-oriented compiler is available for $50,000 or $500/mo, 4C said from 1823 W. Lomita Blvd., Lomita, Calif. 90717.

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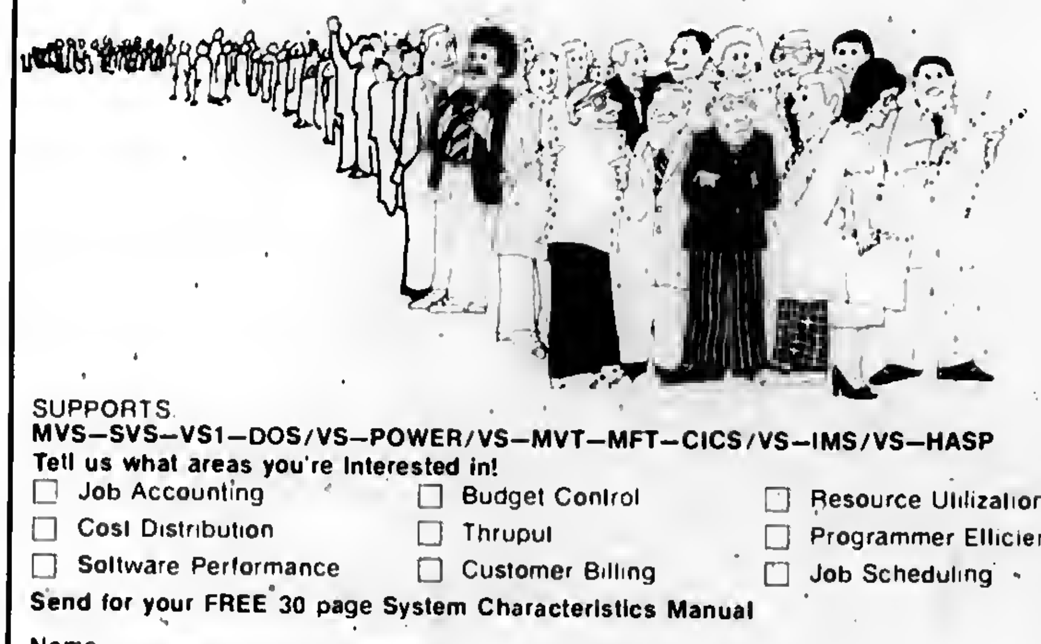

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'Speedy' Reblocks Disk, Tape, Cuts DOS/VS Throughput Time

NEW YORK – Speedy is a DOS/VS enhancement package that cuts system throughput time by reblocking disk and tape files, according to its vendor, Datachron Corp.

Speedy increases block sizes for tape files to 6K, 8K, 12K or 16K bytes. It provides full- or half-track blocking for sequential disk files, Datachron said.

The effect is to take advantage of larger partition sizes in DOS/VS systems, a spokesman noted.

Reblocking takes place during normal processing runs and requires no program changes or file modifications, he said. Speedy's work reduces the number of I/O operations and, for disk files, the disk arm movement that Datachron said can be the most serious bottleneck in DOS/VS multiprogramming.

The end result is typically a 20% to 40% improvement in processing time and a 50% to 75% reduction in system overhead, Datachron claimed.

Speedy can be installed in any DOS/VS environment. It can be used for all jobs in all partitions or restricted to selected partitions, jobs and files.

The package is available under license for $3,150 or $225/mo, Datachron said from 174 Fifth Ave., New York, N.Y. 10010.

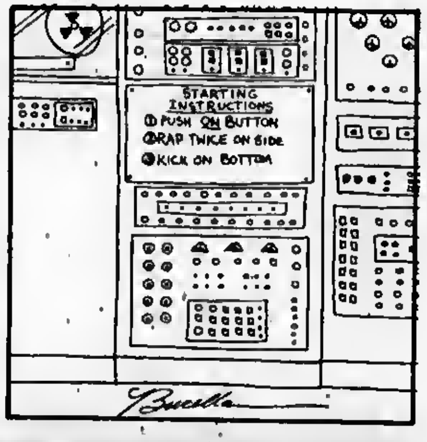
'Page' Provides Cursor Control For PDP Editing

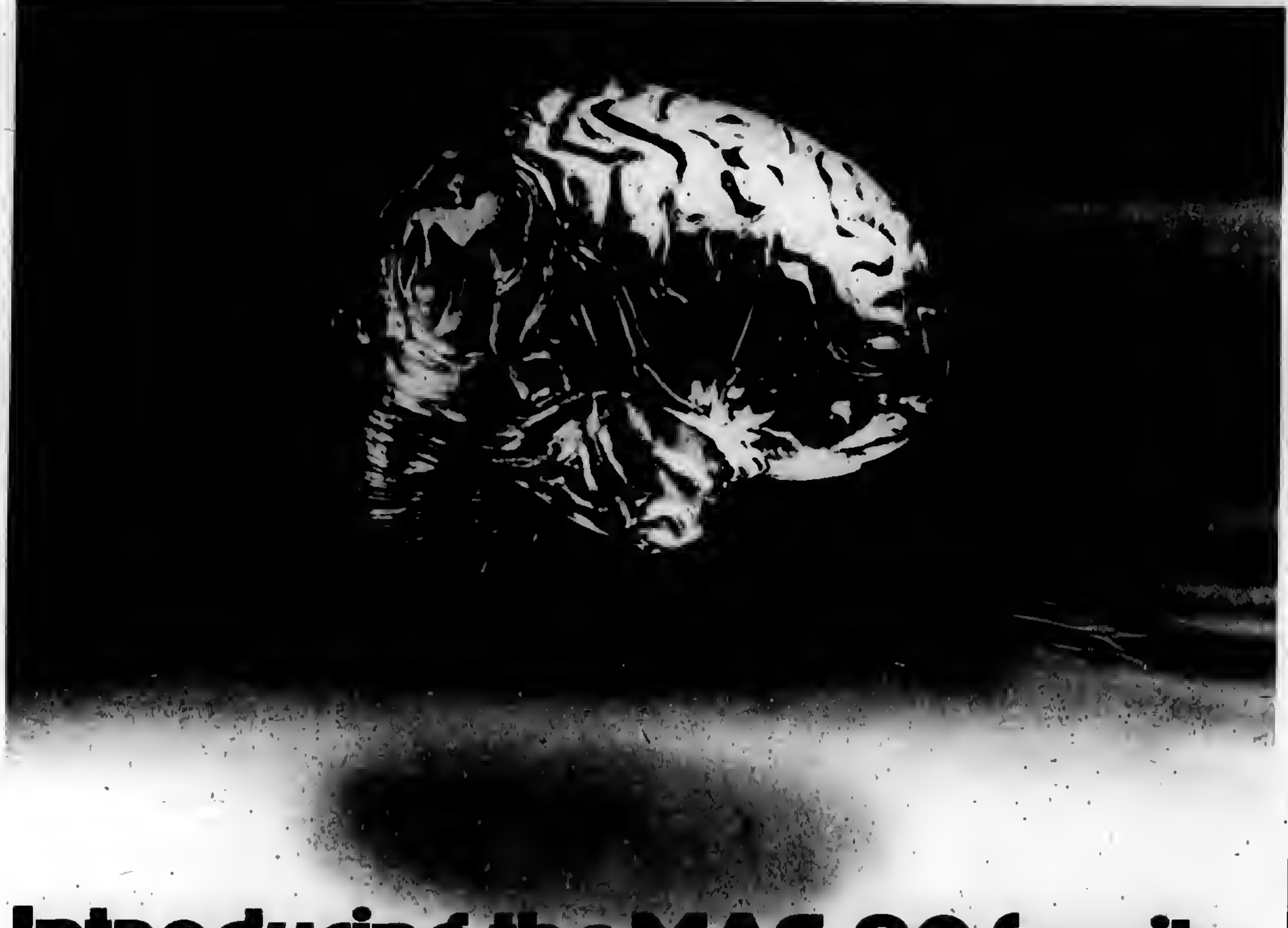
CINCINNATI – The Page package from Interactive Information Systems, Inc. (IIS) was designed to provide the user with the convenience of cursor control during full-screen CRT terminal-based text-editing operations on Digital Equipment Corp. PDP-11s.

Page displays text in context on the screen. Therefore, instead of entering "blind" commands to search, position and modify text, the user can locate text visually, then position the cursor under the character or line before entering the change, IIS said.

Page runs under RSTS/E on PDP-11/34 through -11/70 equipment. It can be implemented on any terminal with direct cursor addressing, some means to move the cursor and "delete line" and "clear line" functions, a spokesman said.

Page can be acquired for $750 from IIS at 10 Knollcrest Drive, Cincinnati, Ohio, 45237.





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People Usage Contingent on Corporate Planning

CHICAGO – Unless the issues of tight schedules, retaining good employees, and corporate objectives are addressed, any planning for the DP human resource is not likely to work, according to Nate Newkirk, president of NGP Associates of Mt. Kisko, N.Y.

In remarks prepared for delivery at the recent Professional Training Conference here, sponsored by Advanced Systems, Inc., Newkirk said it is pointless to plan for the use of any DP resource unless the planners have a grasp of organizational objectives.

Obvious though that may sound, "it is rare to find a DP plan which has a logical connection with a company's stated objectives," he said.

But this is not the only area where DP people planning often fails. Newkirk said it must also be designed to override tight schedules, which are inevitable in most DP departments.

"Give a typical project manager a tight deadline and all planning is dropped. The tighter the schedule, the more time, proportionately, you should spend in planning," he said.

On a different but related subject, Newkirk said personnel turnover statistics should be of "more than superficial" interest to management, although turnover averages that lump all personnel in a shop into one number should be ignored. Concern has to be far more specific than that, he warned.

Newkirk classified people both by their individual performance – good and bad – and by how they liked their jobs – satisfied and dissatisfied. The object, he said, is to retain the good performers, those people that offer the greatest potential. Since satisfied good performers are likely to continue anyway, he advised that "you put your money into good dissatisfied performers."

"You never have enough money and time to adequately train everyone," Newkirk said. "The name of the game is to extend the average seniority of your supervisor performers."

RDC Sets User Seminars

STAMFORD, Conn. – A one-day seminar entitled "Criteria for Choosing an Interactive Financial Planning System" will provide users and potential users with the tools necessary to select the right system for their particular needs, according to the sponsor, Real Decisions Corp. (RDC).

The seminar is scheduled to be given in New York on Nov. 14, in Chicago on Nov. 16 and in San Francisco on Nov. 18.

A unique feature of the seminar will be the development of the RDC financial decisions grid. With a specially designed workbook, each participant will plot his needs vertically and match them against vendors and system in a horizontal spread, an RDC spokesman explained.

Leaders of the seminar, principals of RDC, have spent the last two years in consulting assignments related to financial planning. In April, they published *A Comparative Analysis of Financial Reporting and Modeling Systems*, which is now being updated.

Hillel Segal, president of the Association of Time-Sharing Users (Atsu), will be the luncheon speaker in each city, discussing the role of Atsu in the remote computing industry.

Cost of the seminar is $185 for the first registrant from each company, with discounts available for others from the same firm, RDC said from 870 High Ridge Road, Stamford, Conn. 06905.

Net Updates DBMS

PITTSBURGH, Pa. – An improved version of Oliver, an interactive, generalized data base management system (DBMS), is now available on the remote computing network of On-Line Systems, Inc.

The enhancements make Oliver more efficient and flexible, the vendor said from 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

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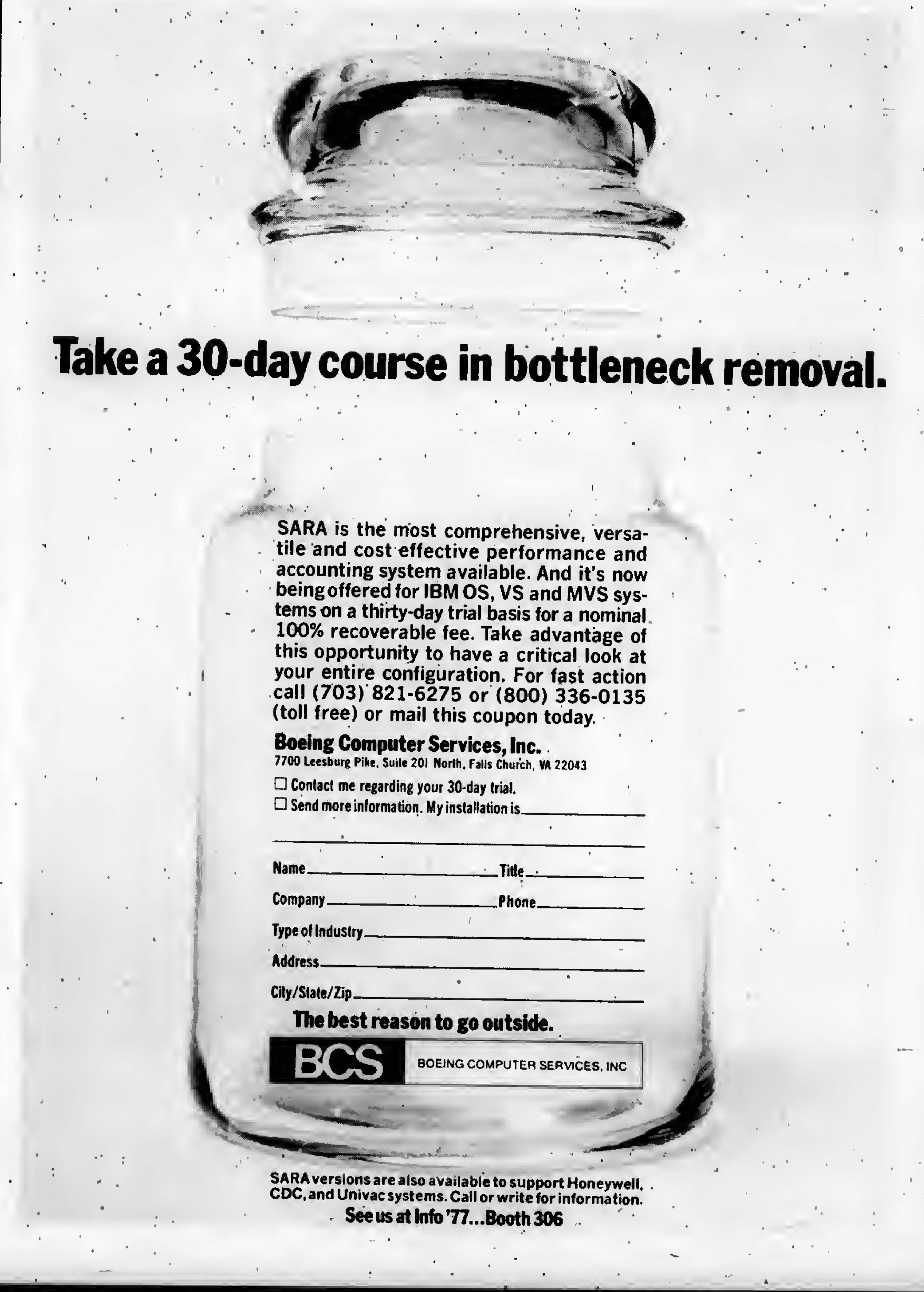
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High-Level Language for PDP-8 Allows OS/8 Basic Compilations

OAK PARK, Ill. — A high-level, business-oriented language for the Digital Equipment Corp. PDP-8 series of minicomputers, Hibol from Dewar Information Systems Corp. will generally accept Basic language syntax so that existing OS/8 Basic programs can be compiled, the vendor said.

The extended math functions of Basic are not present, a spokesman noted. Instead, Hibol provides bilevel random access as well as sequential file handling, full OS/8 directory support and background spooling, he said.

To ease the use of the language in commercial environments, decimal arithmetic and upper/lower case character string manipulation are provided. Hibol also includes functions to convert dates to Julian Day numbers and vice versa, the spokesman added.

The language allows variable-length symbolic labels and variable names and introduces several language extensions such as IF ...THEN ... ELSE statement blocks and an array search statement.

Symbolic debugging facilities in the runtime system permit the programmer to trace program execution, set breakpoints and examine or modify variables as the program is running, the spokesman noted.

Hibol requires a PDP-8 with 16K of memory running under OS/8. The compiler is available for a one-time license fee of $495 from Dewar at 221 W. Lake St., Oak Park, Ill. 60302.

SBC Service Offers MVS

GREENWICH, Conn. — The Service Bureau Co. (SBC) has upgraded the operating system of its Call/Plus remote computing service from IBM's OS/MVT to OS/VS2 Release 3.7, the multiple virtual storage (MVS) environment.

The change will enable SBC to provide users with various application products and services which, because of their VS orientation, have been unavailable under Call/Plus until now, a spokesman explained.

IBM's Job Entry System 2 (JES2), built to function in the VS environment, has replaced SBC's previous Hasp subsystem, providing users with increased function and performance, he said.

The remote computing vendor has also enhanced the support it provides for Time Sharing Option (TSO) operations, the spokesman noted from 500 W. Putnam Ave., Greenwich, Conn. 06830.

Utility Provides Data for DOS

CALGARY, Alta. — DMCVtoc from DMC Information Systems, Ltd. is a utility program designed to produce meaningful volume table of contents (Vtoc) information in a DOS or DOS/VS environment, according to a spokesman.

The program produces a graphic display of all specified cylinders showing both track utilization and data set names. Additionally, the program produces two reports, one in data set name sequence and the other in physical track sequence.

DMCVtoc is said to be compatible with all physical disk drives and file organization techniques available to the DOS or DOS/VS user community.

The software sells for $395. The company can be reached through Box 9234, Bow Valley Square II, 205 Fifth Ave. S.W., Calgary, Alta. T2P 2W4, Canada.

Inforex Release Gives 1330 Features to 1303

BURLINGTON, Mass. — Inforex, Inc. has a software package designed to bring users of Model 1303 key-to-disk data entry systems many of the features of the more powerful Model 1330 intelligent key-entry system introduced earlier this year.

The package, designated Release 309E, combines extended editing capabilities, several new library facilities and comunications and remote job entry support, according to a spokesman.

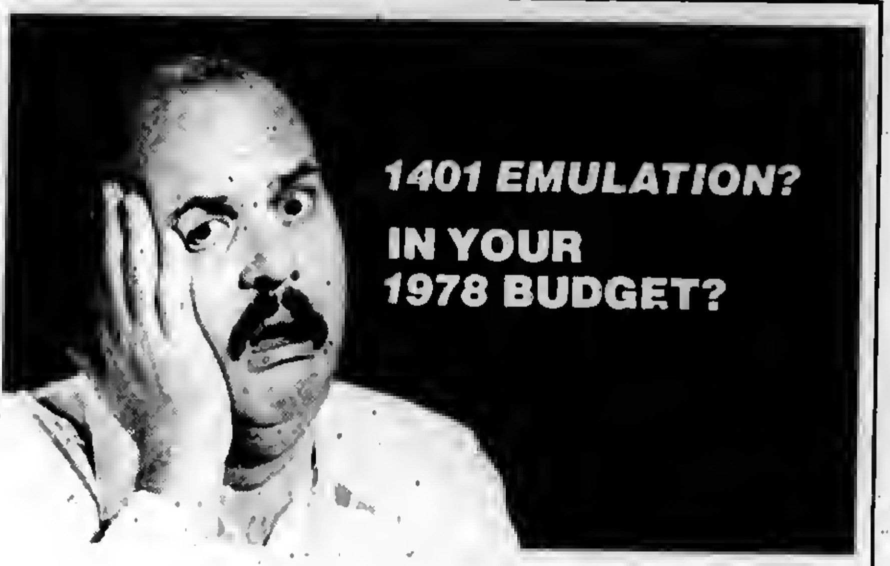
Release 309E supports single keystroke commands that enable operators to insert/delete characters, to return to any location within a record batch after paging backward through multiple records, to return to the first keyable position within a record and to repeat keystrokes with a single key depression, Inforex said.

Model 1303 users can create collated index sequential files for rapid table lookups and validation. Tables can be structured to define a wide range of valid entries and the tables can be organized alphabetically or numerically to speed operations, the spokesman said.

Supports BSC

The package also supports Binary Synchronous Communications (BSC) at speeds up to 9,600 bit/sec going to mainframes, other BSC-oriented terminals or output devices.

Release 309E is currently being distributed free to all Model 1303 users, Inforex said from 21 North Ave., Burlington, Mass. 01803.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User Gains Packet Compatibility

Independent Front Ends Upgrade Net

ARLINGTON, Va., — To accommodate additional communications lines, increase customer access to its computers and add packet network compatibility, American Management Systems (AMS) has replaced IBM 270X-type terminal controllers with two programmable communications processors from an independent vendor. Both processors were put on-line without interrupting customer service, according to the user.

The processors will enable a variety of independent computers owned by the service company's clients to communicate with the firm's IBM mainframes. Code conversions will be handled in the processors rather than burdening the mainframes with the conversion task.

The Memorex Corp. 1380 communications processors will also permit the AMS network to utilize standard packet protocol and, eventually, IBM's Synchronous Data Link Control (SDLC). Software resident in th 1380, rather than redundant hard-wired multiplexers, will handle the standard packet communications.

The processors feature flexible disk storage of the communications programs and consequently relieve the mainframes of communications overhead required by other types of communications controllers, a Memorex spokesman noted.

In addition, the 1380 communications processors have the ability to perform system tests, checkout and downline diagnostics on the network as well as on the processors themselves, he said.

AMS provides access to its mainframes for development of software before it is entered and run on client's computers. The AMS CPU's are an IBM 360/65 and an IBM 370/165 with IBM's Dynamic Address Translation (DAT) feature.

Outgrowing its original data communications handling capabilities led AMS to install the 1380 processors. According to Tom Martin, vice-president of the computer services division, "As we reached the line saturation point of our original terminal control unit, we wanted to add a communications processor with the channel capacity to reach both computers, handle more lines and perform a considerable variety of diagnostics and tests of the whole system."

The AMS system supports three principal functions.The first is a 65-line network for Wilbur, a software development text editor, that uses asynchronous communications from widely differing terminals at client locations. The second is the Customer Information Control Syteem, (CICS) an IBM transaction-based system employing polled 3270 terminals, and the third is a Hasp/RJE remote job entry system with 48 binary synchronous lines ranging from 2,000 bit/sec to wideband 19.2 kbit/sec circuits.

Unusual Installation

The installation of the first 1380 at AMS was unusual in requiring that customer service be uninterrupted. To meet this need, a few lines at a time, beginning with asynchronous lines, were moved from the older controller to the programmable 1380.

The last !ines transferred were those for remote job entry. The switch took about two months, and that time was used to train AMS people to handle software development for the new processor.

"Hardware and software support have been excellent," Martin said. "The hardware has been 100% reliable, and Memorex gave us the support we needed to handle the complicated software task of Hasp-to-Hasp computer communications for the remote

(Continued on Page 42)

Micro-Based Controller Links TRW Terminals, Various CPUs

By Ronald A. Frank
CW Staff

HAWTHORNE, Calif. — A microprocessor-based communications controller has been introduced by TRW to interface the firm's transaction terminals with various host CPUs.

Called the Micro CI, the interface handles up to 16 TRW terminals in a subsystem that normally operates as part of a private-line multidrop network, according to a spokesman.

The Micro CI marks a move by TRW to make its retail, financial and other transaction terminals compatible with non-TRW processors. Previously the TRW terminals operated only with the firm's CPUs as part of turnkey systems such as the System 4000, the spokesman noted.

The controller has built-in modem supplied by Vadic Corp. and operates in most applications at 1,200 bit/sec. It also has the capability to operate at 300-, 600- and 1,800 bit/sec on four-wire full-duplex circuits, TRW said.

The Micro CI uses a Motorola M6800 microprocessing unit and can operate with TRW terminals including the 4103 and 4110 credit terminals and the TT 115 and TT 154 funds transfer terminals. It can also handle Ascii-type glass teletypewriters such as those supplied by Lear-Siegler and Conrac, the spokesman said.

The controller is compatible with several protocols including the TRW Comcode, described as a four-bit hexadecimal character code that interfaces with Ascii networks. Other supported protocols are those used by the IBM 2848, Burroughs TC 500 and TRW FSD terminals.

The Micro CI can interface with host CPUs that include the IBM 360 and 370; NCR 723 and Burroughs B5000, TRW said.

Applications for the controller include retail environments such as specialty stores, car rental agencies, airline ticket counters and hotels. Financial applications and other data entry applications including inventory control are also suitable for the controller-based terminal subsystem, TRW said.

The controller is modular in design and allows the user to perform diagnostics such as analog loopback and cyclic redundancy tests.

A typical terminal subsystem costs "between $1,000 and $2,000 per controller and about $400 per terminal depending on customer requirements," the spokesman said from TRW Data Systems at 12911 Simms Ave., Hawthorne, Calif. 90250.

TDM Handles Two Channels

ROCKVILLE, Md. — Syntech Corp. has introduced a two-channel time-division multiplexer (TDM) that reportedly allows simultaneous transmission of two channels of asynchronous data over a single synchronous data communication line.

Suitable for applications in which two or more asynchronous data channels must be transmitted over a common distance of 50 miles or more, the TDM-2 can be used in private-line terminal-to-terminal or computer-to-terminal applications, the company said.

The product also suits point-to-point or multipoint networks and allows each channel to operate independently in full-duplex, half-duplex or simplex mode.

At $995, the TDM-2 comes with an EIA cable and two EIA receptacles.

Syntech is at 11810 Parklawn Drive, Rockville, Md. 20852.

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Telenet Implements X.25 Interface Service

WASHINGTON, D.C. — Telenet Communications Corp. has introduced a synchronous data communications service for computers and other programmable devices equipped with a standard X.25 interface. The firm said service is the first in the U.S.

Following completion of successful test operations at initial customer sites, X.25 support is being made available in Boston, Chicago, Dallas, Los Angeles, New York, San Francisco and Washington, D.C.

Expansion to additional cities is proceeding; by the first quarter of 1978, X.25 support will have been extended to a total of 22 cities, according to Telenet.

The X.25 interface has been approved for worldwide adoption in packet networks by the Consultative Committee on International Telephone and Telegraph (CCITT). A number of equipment manufacturers and software firms have indicated their intent to provide X.25 interfaces for their product lines, Telenet noted.

Raytheon Data Systems provides an interface for its IBM 3270-compatible Raypac terminals. X.25 availability has also been announced by IBM World Trade in Canada and France.

The X.25 protocol adds capabilities for users of Telenet's public packet network and other compatible packet networks. The interface permits a customer computer to handle up to 4,095 logical connections simultaneously over a single network access line, Telenet said.

Each connection is switchable on demand and individually flow-controlled, permitting devices of dissimilar speeds to communicate with each other without loss of data or congestion, a spokesman added.

In addition to Telenet in the U.S., X.25 service is being planned for implementation in public packet networks in the UK, France, Japan and in the Common Market Euronet network. It has already been implemented in the Trans-Canada Telephone System's Datapac network.

The X.25 interface is available without additional charge to Telenet customers. Telenet Communications Corp. is at 1050 17th St., N.W., Washington, D.C. 20036.

Front Ends Add Packet Feature

(Continued from Page 41)

job entry system."

The 1380 can operate as a front-end processor for up to four 360 or 370 CPUs and each can control up to 216 communications lines. Unlike older hard-wired units, the 1380 has a control console for system checkout testing and downline diagnostics; the unit detects line errors anywhere in the system. Disk drives store the communications software for the processors without involving the mainframes, Memorex said.

AMS selected options with its 1380s to handle medium-speed, high-speed and wideband communications lines. The company uses two channel adapters per communications processor to connect both processors with both computers.

Plans for X.25

Plans are being implemented to add the Memorex X.25 program for standard packet transmission between the CPUs and IBM's Network Control Program (NCP) software for SDLC. The communications processors will then handle demultiplexing for standard packets in the software.

The packet network protocol system, recently adopted as a CCITT standard, will offer the advantage of tying the AMS system into other systems using standard packets. Software demultiplexing eliminates redundant hardware in the multiplexer; the 1380 can handle processing for this type of transmission, while 270X-type equipment cannot.

The capabilities of the 1380 made it possible to connect a second control console to the communications processor during the installation of the first unit at AMS, Martin noted.

Currently, in-house use consumes about 5% of AMS data processing, with the remaining 65% being done for outside clients.

In the future, software will be included in the 1380s to handle communications with Digital Equipment corp. PDP-11 processors at remote client sites, with the 1380 handling the code conversion for communications with the IBM mainframes.

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Trivex Local Controller Works With IBM 3272

COSTA MESA, Calif. — Trivex, Inc. has announced the Model 0722 local controller, which it described as 100% compatible with IBM's 3272 unit.

The controller features "total cluster diagnostics." IBM or Trivex CRTs and printers can be attached in any combination, Trivex said.

Ignores Bad Units

The Model 0722 is microprocessor controlled and programmed to ignore nonoperational cluster devices, a spokesman added. This assures that a bad device will not tie up the computer channel or communications line, making the total cluster and potentially all channel devices inoperational, he explained.

Trivex also announced two enhancements for its Model 0772 CRT, which is compatible with the IBM 3277. The enhancements are a 10-key numeric pad and a 25th line on the display.

The controller is available on lease plan or purchase. The purchase price is $5,390, while lease rates range from $140/mo on a four-year term to $170/mo on a two-year term.

Trivex is at 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

Micom Unwraps Processor Built Around Z80 Micro

CHATSWORTH, Calif. — Micom Systems Corp. has introduced the 20 Series communications processor, a self-contained communications oriented microcomputer system built around the Zilog, Inc. Z80 microprocessor unit (MPU).

The processor was designed to facilitate the implementation of custom communications controllers, according to the firm.

The Series 20 is suited for use with concentrators or contention units with four or eight channels and single-channel converter systems between different communications protocols.

A processor configuration consists of the Z80 MPU, up to 19K bytes of random-access memory (RAM) buffer storage and up to 8K bytes of programmable read-only memory (Prom) control firmware.

It also incudes up to nine synchronous and asynchronous communications interfaces and an operator's console.

The central control module incudes an LED display and 10-position function switch, both under program control, to permit diagnostic test and system monitoring.

A Micom Series 20 configuration starts at $880 for a two-channel unit, according to the firm at 9551 Irondale Ave., Chatsworth, Calif. 91311.

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Seaton Unveils 'Dumb Recorder'

CARROLLTON, Texas — Seaton Corp. has introduced "The Dumb Recorder," said to be a low-cost removable storage device designed to satisfy users' storage needs for communications terminals and controllers.

The SC-1000 is a stand-alone Philips-type cassette recorder with an RS-232 interface. It records and plays back any serial code, operates at speeds from 50- to 1,200 bit/sec and has a 100,000 character data capacity, according to the firm.

Recording on the SC-1000 is incremental by character or by block, a spokesman noted.

Applications for the recorder include use as a high-speed loader for microcomputers, minicomputers, programmable controllers and intelligent terminals; as a paper tape replacement; or in data collection situations.

The basic version costs $795, according to the spokesman for Seaton, which can be reached at P.O. Box 193, 1905 Kirkwood, Carrollton, Texas 75006.

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Omron Terminals Provide for Customization

SUNNYVALE, Calif. — A computer terminal system that allows business users to obtain tailored terminal systems at a claimed 40% to 50% hardware savings has been introduced by the Information Products Division of Omron Electronics, Inc.

Designed to provide an alternative to the high cost of purchasing multiple custom terminals with identical programs, Omron employes its 8035 programmable terminal as a developmental unit to generate finalized application programs for use in 8038 terminals.

The 8035 is a CRT terminal with keyboard entry, peripheral dual floppy disk storage and a developmental software package for the creation of microprocessor programs.

The 8038 is similar to the 8035 with the same physical, mechanical and display characteristics, but without the developmental application package, the company said.

The 8035/38 combination was designed for stand-alone applications where multiple terminals run the same program and program changes are infrequent. "The traditional approach has been to use expensive customized terminals at all locations," a spokesman said.

The 8035 user designs a program that allows an 8038 to suit the needs of a specific application. After debugging, the 8035 program is then transferred onto a floppy disk storage memory.

This disk is then returned to the vendor, where the program is loaded into programmable read-only memories (Prom), creating permanent copies of the original program. These Proms can then be installed in any number of 8038s, making each capable of performing that specific program, the firm said.

"The 8035/38 combination has two primary types of applications," the spokesman said. "For a business or institution where a more expensive system of tailored terminals is anticipated, our 8035/38 combination can accomplish the same operational results for much lower cost.

"For example, a 20-terminal system of intelligent devices might cost approximately $150,000, while a comparable system of one 8035 at $7,500 and 19 basic 8038s at $2,750 apiece would cost $59,750."

Prices will vary with the exact features specified, such as extra pages of storage or printer option, he added.

Omron Electronics is at 432 Toyama Drive, Sunnyvale, Calif. 94086.

Doll, Elfenbein To Give Course In N.Y., London

MONTCLAIR, N.J. — Technology Insight Foundation has scheduled two repeat sessions of its three-day course on international telecommunications. The session will be held Nov.14-16 at the New York Hilton and Dec.12-14 at the World Trade Center in London.

The fee for the course is $575 and includes all sessions, lunches, a reception, a two-volume text and substantial technical material distributed for various PTT and common carrier services.

Lecturers for the course will be Leonard Elfenbein and Dixon Doll. Elfenbein is president of Telecom Systems Group, Inc. here and Doll is president of DMW Telecommunications Corp. in Ann Arbor, Mich.

The course is held in cooperation with the World Telecommunications Directory (WTD), and much of the services, tariff, and technical information included in the course is provided by the WTD, according to the spokesman.

Further information is available from Technology Insight Foundation, P.O. Box Y, Montclair, N.J. 07042.

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Incoterm Controller Links Small Clusters With CPUs

WELLESLEY HILLS, Mass. — Incoterm Corp. has announced a small cluster controller, the SPD 15/25, for installations requiring one to four CRT operator stations.

The SPD 15/25 terminal processing unit (TPU) is a programmable controller for the attachment of CRT terminal clusters and for on-line communication to a CPU. It is said to operate with the communications protocol of a variety of mainframe computers.

The units can provide support for up to two 1,920-char. displays or up to four 960-char. CRTs, as well as for a full line of printers, Incoterm said. The TPUs can be multiplexed to share a common modem and to offer increased display positions should the application require, a spokesman added.

The SPD 15/25 contains a fully programmable interrupt system, an arithmetic/logical processor and a real-time clock. The TPU also contains a refresh subsystem with 4K bytes of directly addressable random-access memory (RAM) for screen data, the company said.

The SPD 15/25 memory can be configured from RAM, erasable programmable read-only memory (Eprom) or core. Up to 64K bytes of addressable memory are allowed, according to Incoterm.

The SPD 15/25 has a built-in communications controller operating in full- or half-duplex mode, with synchronous or asynchronous protocols at speeds ranging from 75- to 9,600 bit/-sec. All standard communications line codes are supported, including Ascii, Ebcdic and Baudot, Incoterm claimed.

In addition, the SPD 15/25 provides 15 levels of priority interrupts and interfaces capable of controlling a wide variety of peripheral devices, the firm said.

The SPD 15/25 is offered in three configurations.The primary system permits users to program applications utilizing Incoterm-provided Assembly language and executive routines. Prices for the standard system range from $5,570 for single-station configurations to $7,235 for dual configurations.

The airline Pars configuration, ranging from one to four stations, is priced from $4,680 to $8,370. Quantity discounts are available for both the primary SPD 15/25 and the Pars configurations.

Standard emulator software packages for the SPD 15/25, including IBM 3270, Honeywell VIP 7700, Univac U-100 and Burroughs TD 820, are available. Purchase prices for emulator configurations range from $4,400 for single stations to $5,633 for dual configurations.

First customer shipments will begin in December, Incoterm said from 65 Walnut St., Wellesley Hills, Mass. 02181.

Multi-Use Modems Gain Remote Testing

FT. WASHINGTON, Pa. — Tele-Dynamics has added a capability to its Model 7208 4,800 bit/sec modem to permit remote diagnostic testing in either point-to-point or multipoint networks.

Selection of the remote modem to be tested and control of the test mode desired are made from a single central site without operator attendance at the remote sites,the company said.

The remote diagnostic capability is available as an optional feature or can be added to 7208s already operating in the field by plugging in a standard PC card in each modem. No other equipment modification is required, according to the vendor.

With the capability, the point-to-point Model 7208A costs $2,750 and the multipoint Model 7208B costs $3,100. Tele-Dynamics is at 525 Virginia Drive, Fort Washington, Pa. 19034.

Patches Ease Circuit Changes

MOORESTOWN, N.J. — Spectron Corp. has introduced a series of telephone line patches that facilitate the rearrangement of telephone circuits and related equipment to meet data communications system requirements.

The Model TLP-416 provides a patch field for 16 four-wire lines or 32 two-wire lines. Spectron's Model TLP-408 can accommodate eight four-wire or 16 two-wire telephone circuit appearances.

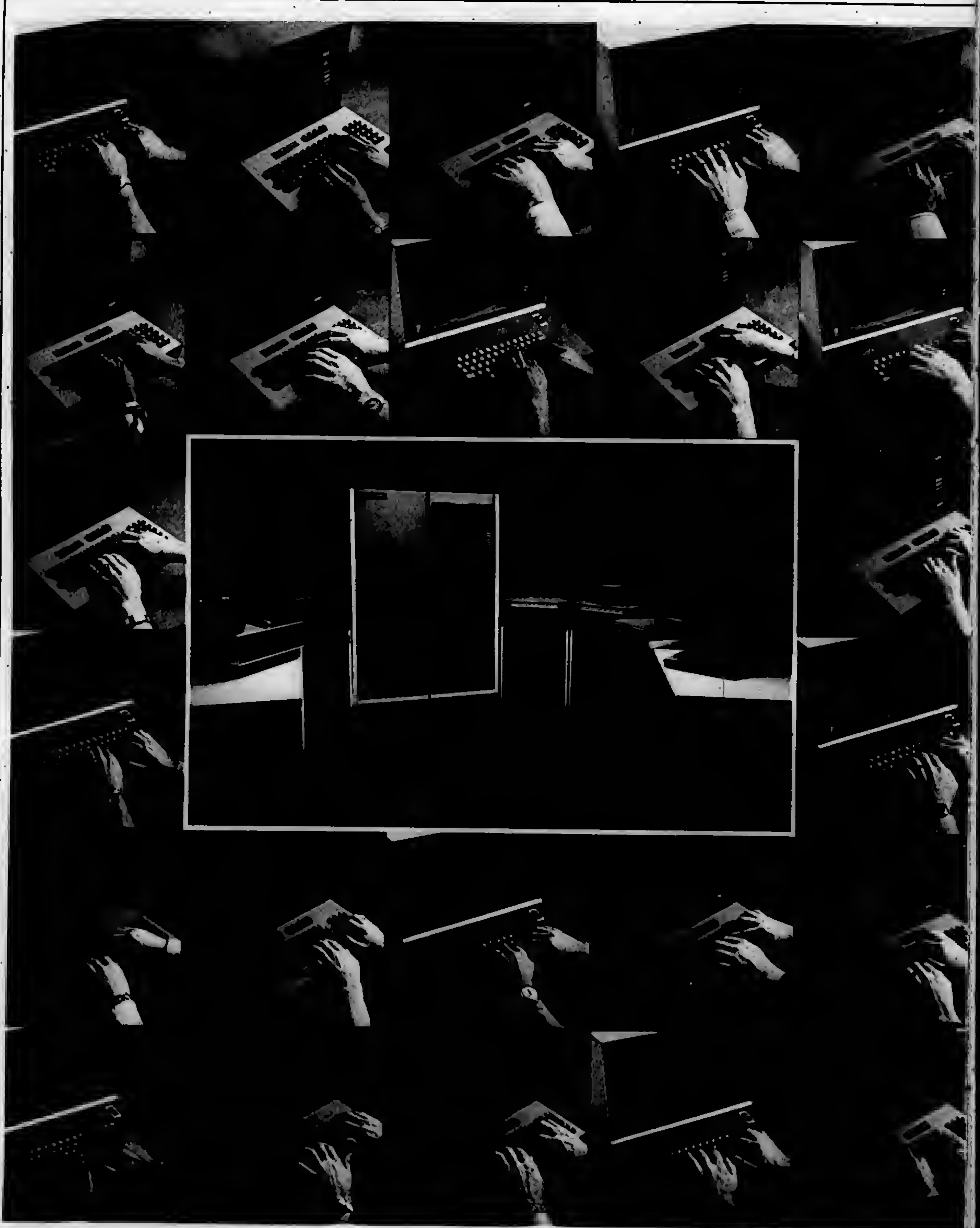
The patches are modular in design, enabling units to be added as requirements demand, according to a spokesman.

With the units, users can patch any telephone line to any modem and monitor the line without disturbing network operation, he explained.

Test equipment may be permanently connected to a spare position to facilitate measurements of line or modem parameters, and data access arrangement (DAA) units may also be wired to spare positions

The TLP-416 and TLP-408 were designed to be mounted in a standard 19-in. rack. The telephone line and modems are linked by connectors mounted at the rear of the unit; an identification marker strip is provided for circuit identification.

The TLP-408 costs $390; the TLP-416 is priced at $580, Spectron said from 344 New Albany Road, Moorestown, N.J. 08057.



Portable Units Lower Jet Fuel Use

ONTARIO, Calif. — Multimillion-dollar corporate jet and turboprop aircraft are being helped to reduce costly fuel consumption by computerized flight scheduling and planning that utilizes portable data terminals.

A computer-based flight planning services used by corporate pilots, as well as airlines and the U.S.Navy, is Jetplan from Lockheed Aircraft Service Co. Jetplan provides, via Computer Devices, Inc. (CDI) portable Miniterm units and an IBM timesharing CPU, the information required by pilots so maximum travel with the lowest fuel consumption is possible.

Corporate pilots have access to worldwide weather reporting, route analyses and complete performance data for more than 50 jets and turboprop aircraft.

"Corporate jets are considered important business tools and fuel savings mean real dollars saved, as well as reduction of energy consumption. This is a real, attainable goal sought by most major corporations," according to Lou Reinkens, manager of aviation services for Lockheed.

That's where Jetplan comes in. Instead of two or more hours of calculations, the corporate pilot plugs his portable Miniterm terminal into a wall outlet and inserts a telephone into the built-in acoustic coupler. He dials the computer and types in his aircraft, desired route and payload. Within seconds, the pilot gets back a complete flight plan.

Although the Jetplan service is available to users via Telex and TWX, more than 100 subscribers use CDI Miniterm 1203s available directly from Lockheed.

"Pilots use Miniterms directly from airports — even using pay phones — or in their hotel rooms. Because they can talk to the CPU and get complete flight plans in only seconds, they can wait until just before boarding time to optimize their fuel loads" with the terminals, Reinkens said.

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CPC Family Has Same Software, Different Keys

BRIDGEPORT, Conn. — Computer Peripheral Corp. (CPC) has introduced a family of microprocessor-based CRT terminals that permit upward and downward integration.

Designated the Cops 15, 20 and 30 series, the terminals allow users to interchange terminals without changing software, a spokesman said.

The terminals also offer customers features like reverse video by character and by field and buffered keyboard transmissions, he added.

Terminal Transactions

They are also software-compatible with Digital Equipment Corp. VT52s and three Lear Siegler, Inc., terminals — the 80M1, 80M1A and 80M2A.

The terminals are rated at 60W, nominal, and come in 63-, 80- and 104-key keyboard configurations.

The 63-key Cops 15 costs $1,125; the 80-key Cops 20 is priced at $1,175; and the 104-key Cops 30 costs $1,425 from CPC at 1225 Connecticut Ave., Bridgeport, Conn. 06607.

Digi-Log Station Has Zilog Micro

HORSHAM, Pa.— Digi-Log Systems, Inc., has introduced a CRT terminal workstation that incorporates a Zilog, Inc., Z80A microprocessor.

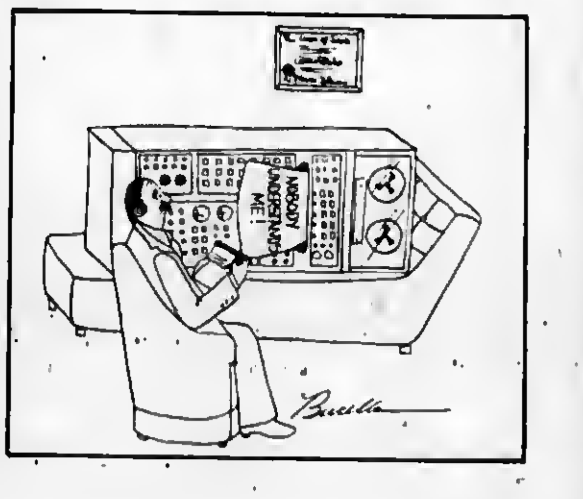
In tests of seven short benchmarks, Microterm II outperformed 21 competitive microcomputer systems, the firm claimed. Results of the benchmark tests, which were written and supervised by Tom Rugg and Phil Feldman of Los Angeles, appeared in the May issue of *Kilobaud* magazine.

Costing $4,000 to $9,000, the workstation uses Microterm II Basic, an extended version of Dartmouth Basic, and incorporates a Basic interpreter that is integrated with minidiskettes, CRT terminals, printers and I/O channels.

The unit typically serves as a data entry terminal, inquiry device or message-switching terminal.

The terminal also allows operators to enter data through the keyboard and, at the same time, receive computer communications for storage or printing, the company added.

Microterm II is available from Digi-Log on Babylon Road, Horsham, Pa. 19044.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BASF The Original.

Computer Tape Hard and Flexible Disks Cassettes Mag Cards

Automated Library Holds 8,351 Reels, Cuts Labor Costs

By Jeffry Beeler
CW Staff

ST. LOUIS — A programming house here has cut its production staff by 15 and in effect has gained an additional six hours of throughput a day since the organization replaced its manual tape-handling system with an automated tape library.

John Ballard, deputy director of DP at the Army's Automated Logistics Management Systems Activity (Almsa), credited these twin benefits to the library's ability to eliminate many of the production steps and delays that previously characterized Almsa's software development. Because of the personnel cuts, the machine will also trim the programming house's labor costs by an estimated $1.2 million during the next eight years, Ballard predicted.

Billed by its manufacturer as the largest mass data storage and retrieval system ever built, the 1.5 trillion-byte library aids development of the Commodity Commands Standard System, a software package that manages military logistics throughout the U.S.

When an army base places a requisition order, the operating system directs the appropriate supply depot to ship the requested material and makes sure the depleted stock is replenished, the deputy DP manager explained.

Using the automated tape library, Ballard and his staff of about 650 perform an unstructured mix of 600 to 700 jobs a day, he added.

Drives Formerly Used

Before it acquired the automated tape library, Almsa stored and accessed its computer tapes with 19 IBM 3425/7 drives arranged in a giant U. When not mounted on one of the drives, the tapes themselves were stored in large racks in a separate room.

Whenever Ballard and his staff received a job request, they generated a card that indicated the reel of tape that would be required to support the application. They then retrieved appropriate reels of tape from the racks, placed them on a cart and transported them to the room housing the tape drives.

After the reels were mounted on the drives and the jobs were completed, the Almsa staff placed the tape back on the cart; returned it to the racks and refiled the reels in their original sequence.

Unfortuantely for Almsa, this process of manually transporting tape reels back and forth between the library racks and the computer rooms was labor-intensive and involved much duplication of effort, Ballard recalled. It also resulted in numerous DP errors and prevented the staff from keeping its tape file completely up-to-date, he added.

Narrowed Choice

As a result, Ballard and other Almsa officials began as early as 1970 to consider automating their largely manual tape-handling procedure. At first, they evaluated computerized tape libraries from vendors like Ampex Corp., Precision Instrument Co., Laser Stroage Corp. and Data Products Corp., but for various reasons they rejected all those alternatives.

The Laser Storage Unit, for example, cost too much and, as a product that had not yet evolved beyond the prototype stage, it had not proven its reliability to Almsa's satisfaction.

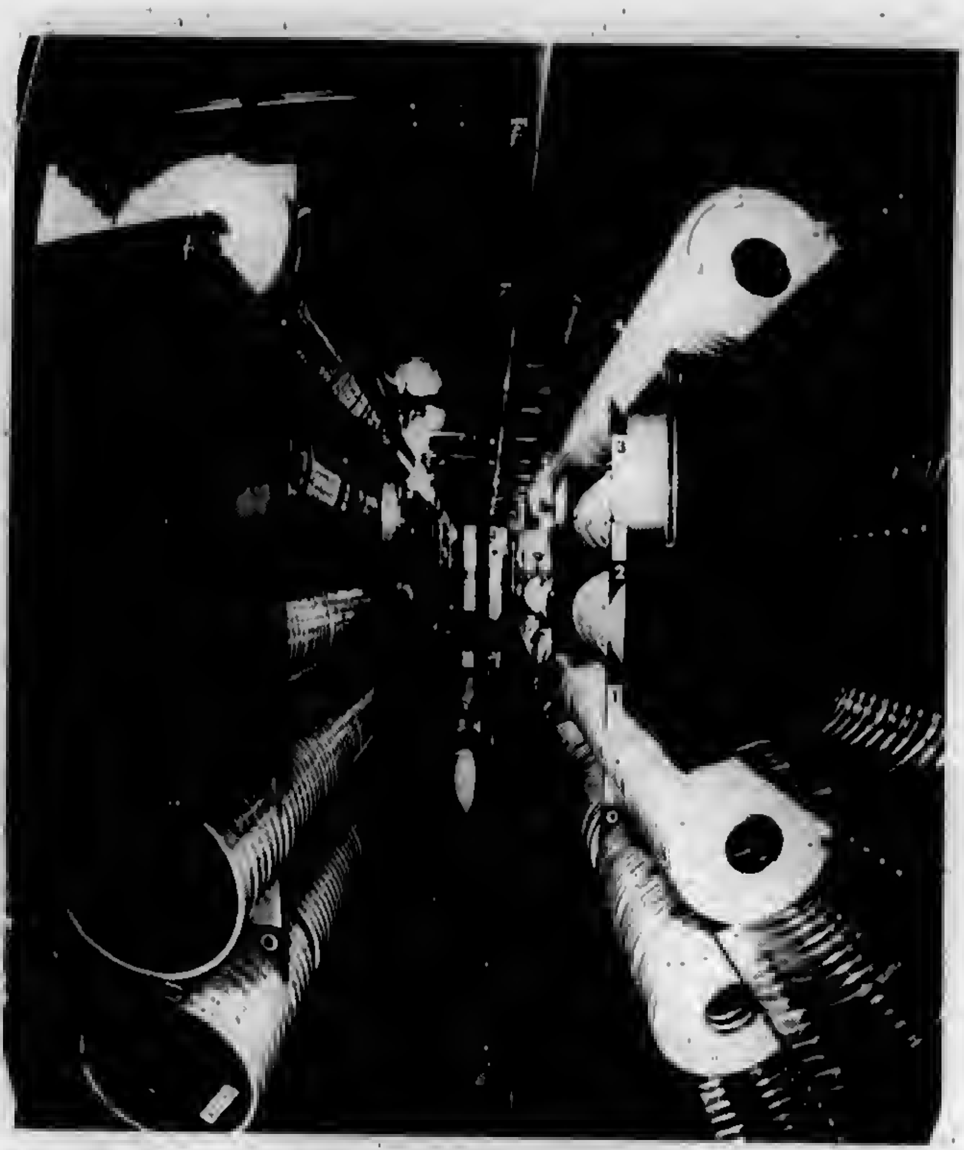
For this reason, the programming house was not willing to take a risk on that particular manufacturer's product. "We weren't heroic enough to go out and spend the amount of money Laser Storage wanted for its tape library and then possibly break our necks trying to make it work," Ballard explained.

The Ampex machine, on the other hand, simply did not fit the software house's application. Ballard considered the product better suited to storing and retrieving archives and similar records than to managing Almsa's tape files, which are accessed much more often and less systematically..

A few years later, Almsa officials considered installing an IBM 3850 and various Control Data Corp. tape libraries. But those alternatives operate only with IBM 370 computers, and Almsa uses a 2.5M-byte 360/65, which the organization intends to keep indefinitely, Ballard said.

The deputy DP director and his associates eventually opted for a

(Continued on Page 57)



An inside view of the Calcomp Automated Tape Library. The unit maintains status, usage and location data on all tape files within the system. The Almsa site is 100 feet long and holds 8,351 tape reels.

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Schueppel observes a student at Madison Area Technical College.

College Maintains Costs, Quadruples DP Capacity

MADISON, Wis. — The Madison Area Technical College here replaced a batch-oriented system with an on-line system and reports significant benefits with no increase in cost.

The college claims a fourfold increase in DP capacity and capabilities, a 100% increase in programming productivity and efficiency, easier system access for all users, a reduction in turnaroud for users from as much as 24 hours to three hours or less and an ability to expand without conversions or proportional increases in staff.

The college serves about 35,000 people at a main campus here, a separate technical center and five other locations within 100 miles. Courses and programs of study are administered in six major divisions, including agribusiness, business and marketing, general studies, health occupations, home economics and trade and industry, according to Warner Schueppel, DP supervisor.

The college installed its first CPU, an IBM 1620 with 20K bytes of main memory, in the early 1960s. The system was initially used for an associate degree program in DP, following which usage was expanded to include administrative applications such as student registration and student accounting, he explained.

In 1966, a 32K-byte IBM 360/30 was installed to further develop administrative applications and to serve an increasing number of DP students. The system was upgraded to a 128K-byte 360/40 in 1970 and memory was increased to 384K bytes in 1972. The growth was brought on by increases in administrative applications and usage by accounting students as well as those in DP.

In 1974, a Data 100 Model 70 remote batch terminal was installed to provide system access to engineering as well as accounting and DP students, bringing the total number of students using the system to about 900. At the same time, applications expanded in administrative areas and further demands were received for increased usage in the future.

Saturated in '75

However, by 1975, the system was saturated with applications, limiting the possibilities for growth. In addition, access to the system was not only inefficient, but even unacceptable from the standpoint of turnaround times, which were running as much as 24 hours, Schueppel noted.

At that point, the college developed a five-year plan to not only increase system power for DP but also to install on-line capabilities to provide an interactive environment and reduce turnaround times. However, because of budgetary restrictions, the plan had to include no increase in cost, he explained.

A task force representing all affected groups in both the college and the community developed specifications for the required new system and evaluated proposals made by a number of different vendors. Based on the task force evaluation, the board of directors approved a recommendation to install a Univac 90/60 system. The 90/60 was selected because it not only met all specifications at no increase in cost but also provided the lowest cost of all systems studied.

"The system provides four times the capacity and capabilities of our previous system at the same cost," Schueppel stated. "Previously, we were running three shifts: 24 hours a day, five days a week plus eight to 16 hours on weekends on numerous occasions. Now, we're running more work with only two shifts or 16 hours a day. The third shift has been eliminated and actually, the DP could all be handled in one shift if there was no need to keep up two shifts a day for user conve-

(Continued on Page 56)

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For Blue Cross, Welfare Claims

Tapes Improve Hospital's Cash Flow, Billing

By Stephen L. Priest
And Robert L. Sheehan
Special to CW

BROCKTON, Mass. — The Brockton Hospital here is attacking the problems of cash flow and claim errors by sending magnetic tapes for third-party billing to Blue Cross of Massachusetts and the Massachusetts Department of Welfare.

The Blue Cross tapes contain the Blue Cross and Medicare A outpatient claims and the welfare tape has claims for outpatients, discharged inpatients and 30-day interim in-house patients.

Under the previous method, a paper claim form was prepared by the hospital's in-house mainframe for each Blue Cross outpatient claim four days after service. The claims were reviewed for accuracy by a clerk in the hospital's patient accounting department and then forwarded to Blue Cross for approval and payment.

Blue Cross sent the forms to a service bureau for keypunching. The completed 80-column punched cards representing the claims were fed into the Blue Cross DP system and a magnetic tape was created. The tape was then edited for format errors.

Any tape claims with format errors were rejected as incomplete claims and a printout explaining the incomplete claims was returned to the hospital along with a listing of paid claims and contractual rejects.

The hospital then investigated the claims that were in error and returned another paper claim form to Blue Cross and the data preparation and editing process was repeated.

If the claims had no format errors and payment was approved, the hospital would receive a reimbursement check in three to six weeks from the day the claim forms were originally prepared at the hospital. If a claim was rejected because of a format error, it took an additional three to six weeks since the hospital had to resubmit the claim, assuming no format errors the second time.

As with the Blue Cross claims, the hospital previously prepared and reviewed the Medicare A claims before forwarding them to Blue Cross, the intermediary for Medicare, for approval and payment.

The Medicare A claims were then controlled, reviewed and coded before being entered onto magnetic tape. The tape was processed by the payment system with questionable claims suspended for further investigation. Suspended claims were usually handled by telephoning the hospital directly.

The reimbursement time was usually two to four weeks from the day the claim forms were originally prepared by the hospital.

Updated Procedures

The hospital has now implemented two distinct strings of programs and reports for both Blue Cross and Medicare in order to meet their individual edit and tape format requirements. These separate systems are similar with respect to workflow patterns.

The Blue Cross and Medicare outpatient visits are edited for data errors the day the outpatient visit is established in the hospital's DP system. The initial Blue Cross and Medicare edit exception reports noting the format errors are delivered daily to patient accounting. If patient accounting can correct the format errors before a claim is ready for billing, then the claim will not be delayed in the normal billing cycle.

Once a week the claims due for billing are extracted and put through an extensive edit. The final edit reports are given to patient accounting for correction and resubmission for tape billing.

The claims that pass the hospital's edit go on tape. The tapes are then read and lists are produced of the claims on the tapes along with controls of total amount and number of claims billed. Comparisions are made to insure that only readable and valid tapes are sent to Blue Cross. The completed tapes are delivered to Blue Cross for processing. A payment check for the approved claims on the tapes in usually ready in seven days.

The savings to the hospital with the new system are:

- No storage space or inventory system is necessary since there is no paper form.
- There is a reduction in computer and operator time as magnetic tape is several times faster than hard copy.
- The clerical time necessary to review the printed claims is eliminated.
- There is a faster turnaround time in claim payments, which resulted in a one-time reduction in accounts receivable of nearly $70,000.
- A faster paid claim results in postage savings and less patient confusion in that third-party accounts unpaid after eight weeks are also billed directly to the patient.

Some of the savings to Blue Cross are:

- No forms have to be purchased or stored for hospital claims.
- No data preparation is required from printed forms and more efficient data entry procedures are possible.
- No claims are rejected because of

(Continued on Page 57)

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How Erie County, NY
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It's a fact that most county government data processing departments have very tight budgets . . . and Erie County, NY is no exception. Gerald E. Wilson, Erie County's director of data processing recognizes that up to 30% of the cost of the average county government computer installation is in data entry. He initiated their use of OCR to cut those costs.

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For information on how you can cut data entry costs, contact

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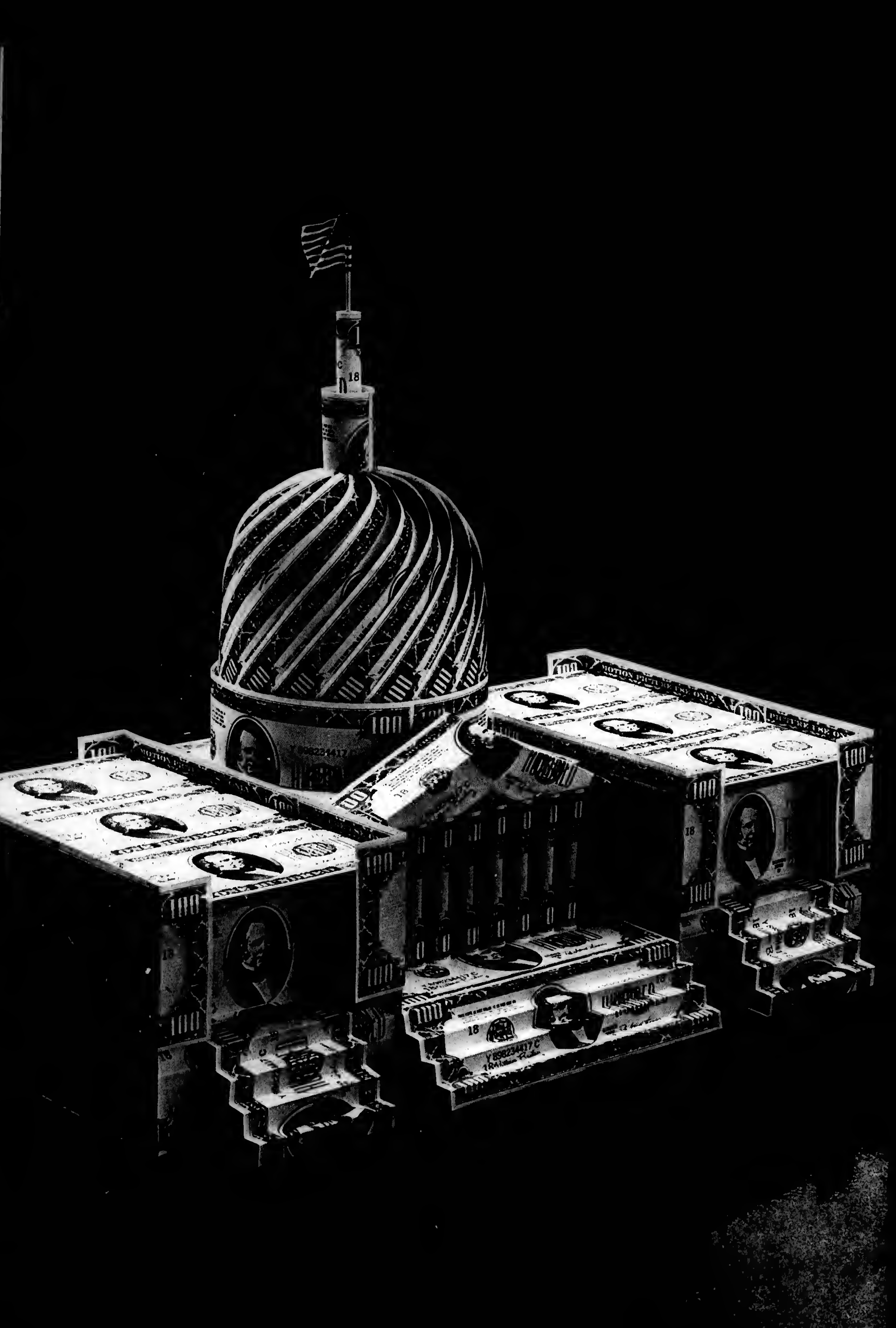
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Monitors Help Tighten Firm's DP Operations

By a CW Staff Writer

NASHUA, N.H. — With the help of hardware and software monitors, Sanders Associates, Inc. was able to eliminate one full shift a week, and another half shift on the weekend is also being thinned, according to Al Raine, Sanders' computer performance evaluation (CPE) specialist.

Sanders also has been able to evaluate 52 software packages in the last three years and will evaluate another 12 in the next 12 months through the use of the CPE monitors, Raine said recently.

Raine was the company's manager of systems and programing before he became the CPE specialist. He admitted having had no understanding of a computer systems operating environment and remarked about his CPE function "it is fascinating to get inside an IBM 370/158 operating system and see how it works."

The Sanders DP shop has a 4M-byte 370/158, 14 single- and double-density disks, a 3705 front-end processor and a 3704 controller supporting the interactions of 100 3270-type terminals under IBM's IMS for on-line and batch applications, while concurrently running IBM's Time-Sharing Option (TSO) during the company's prime shift.

The firm also has a Digital Equipment Corp. PDP-10 supporting 65 terminals. The standard turnaround, according to Raine, is four to five test shots per day per programmer.

Sanders had IBM equipment exclusively at one time and was able to become a "super multivendor shop" with 15 different vendor's hardware and software from 10 different vendors because of the monitoring equipment and packages, Raine noted.

Hardware Monitors

The company has used Comten Inc. monitors to test Honeywell, Inc., Univac, Burroughs Corp., Digital Equipment Corp., IBM, Xerox Corp. and General Electric Co. CPUs, Raine noted.

In addition, Tesdata Systems Corp. makes a range of monitors and the government has some of its own for its systems, he added.

The primary characteristic of hardware monitors is passivity. They won't cause a system crash, as will alternative methods such as "hot probes," according to the CPE specialist.

The monitors have a programmable plug board. The result, he explained, is an absence of system overhead and channel overhead while posing no interference problems to the system under test.

A hardware monitor can help the user save money if the analysis of test data shows that the processor or the system as a whole is being underutilized, Raine said.

The monitor can tell its users if there are bottlenecks and where these problems are located within the system, he said, adding user intelligence is necessary to divine the test results.

A monitor can define device utilization, and can measure the data path or content overlap of the CPU, memory and other system components simultaneously. It can also be used on a processor regardless of vendor, he noted.

Once the problem has been found, a user can spread the processing workload among other devices in the system, he said.

But hardware monitors entail capital investment from as little as $10,000 to more than $100,000. They also require skilled analysts to interpret the reported data and to make the necessary recommendations to management, Raine advised.

Vendors of the monitoring equipment usually give the user a probe point library and a list of ways to determine if users are getting the appropriate responses.

And hardware monitors, as well as software monitors, are dependent upon the DP shop where they are used, the applications being run, devices in the system and the workload.

"You may not get a utilization any higher than 65%, unless you consider downgrading," Raine cautioned.

When using any monitoring tools, the user must have a planned program of objectives, in addition to management knowledge and support of the project, he advised.

"Otherwise, you will fight an uphill battle. Moreover, no director of DP wants to hear that he is not running the greatest shop in the world," Raine said, stressing diplomacy is essential in reporting the test results.

"Make a report, but don't blast people's functions. Put it in hard copy and make it graphic, if possible," he suggested.

Software Monitors

Advantages Raine attributed to software monitors are their comparatively low cost, the ability to identify data set names and usage characteristics, and greater flexibility compared with their hardware counterparts.

Some software monitors cost less than $1,000. They are usually simple to use because they are parameter-driven and the learning process is relatively short, he said.

The software monitor should provide a standard pool of measurements and information on specific applications programs, as well as be able to specify exactly what the user wants to measure.

There are problems with software

(Continued on Page 57)

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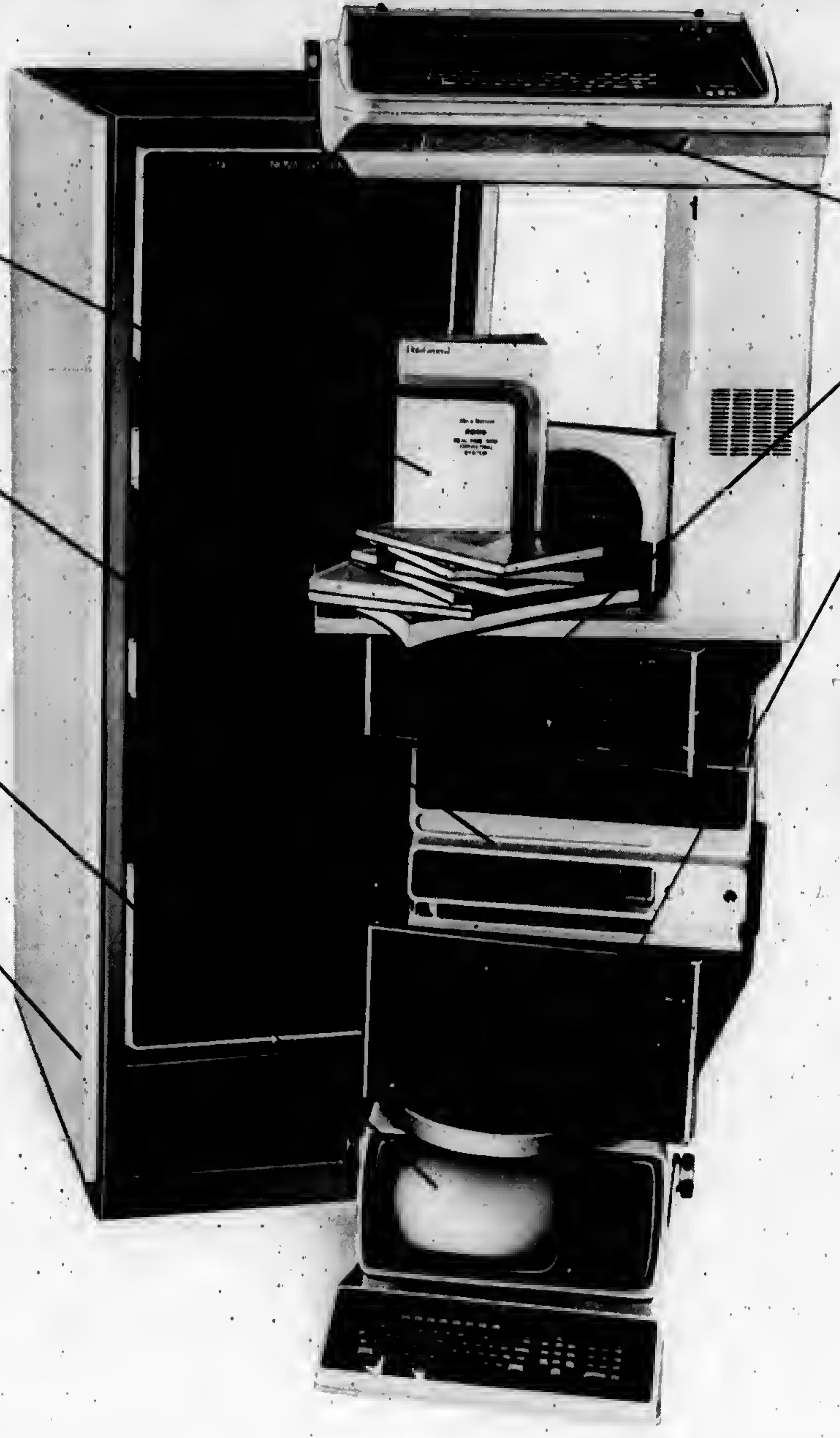

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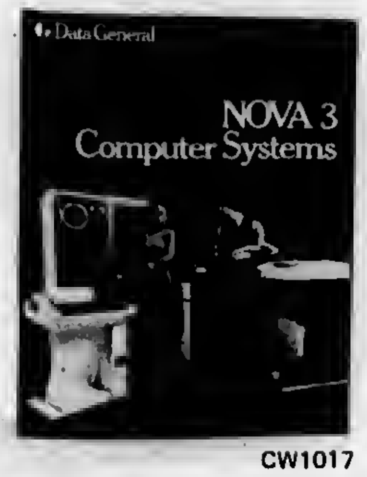

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Light Pen Reads Mixed Bar Codes

SOMERVILLE, Mass. — Ames Color-File Corp. has introduced a bar code data entry system that includes a terminal and light pen and reportedly features two-way communications with a host CPU.

A multiple decoding ability allows the light pen to read mixed types of bar codes, a spokesman added.

With four function keys, the terminal can receive and display up to 15 numeric digits: four annunciator lights are present for operator prompting. The unit accommodates synchronous and asynchronous communications, the spokesman said.

The light pen can read a combination of bar codes including Ames, Codabar and the Universal Product Code.

The Model 810 Ames Guiding Light multiplexer concentrates up to 16 data entry units into a single port, allowing simultaneous use of the pens with no discernable delay to the system, the vendor claimed.

The multiplexer alone costs $3,000. The CRT terminal with keyboard and light pen costs $1,200; without a keyboard, the terminal costs $750. Ames Color-File is at 12 Park St., Somerville, Mass. 02143.

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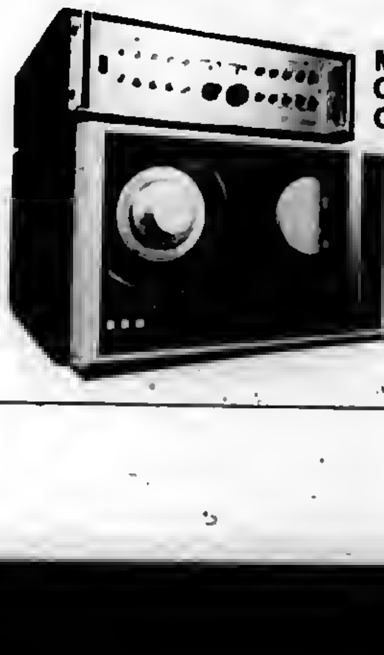

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Bits & Pieces

Planning Seminars Slated

ROCKVILLE, Md. — Keston Associates has announced a fall/winter series of five-day workshops on "How to Develop an Effective Long-Range DP Plan."

While effective long-range planning has long been an important objective of DP management, it has rarely been achieved in practice, according to the firm. The workshops, it noted, take a positive approach to establishing a viable planning mechanism as a means of controlling the DP function.

A set of planning methods and procedures is presented in the course, including: a technique for the projection of future user requirements: a mechanism for mediating between competing user priorities and a procedure for estimating impending hardware, software and personnel needs, the firm claimed.

The workshop taught by Dr. Robert Keston will be presented in Washington, D.C. on Dec. 5-9 and on Feb. 27-March 3; in San Francisco on Nov. 14-18; in Los Angeles on Jan. 23-7; and in Clearwater, Fla., on Feb. 6-10.

The workshop fee is $595 per person, including luncheons. Keston Associates is at 11317 Old Club Road, Rockville, Md. 20852.

Microfilm Standards Topic of Book

WASHINGTON, D.C. — The National Micrographics Association (NMA) has published *Basic Microfilm Standards*, a collection of the five American national standards specified in the Internal Revenue Service (IRS) Revenue Procedure 76-43 which covers microfilming of general books of account.

Also included in the book is a copy of Revenue Procedure 76-43, NMA *Recommended Practice for Inspection and Quality Control of First Generation Silver Halide Microfilm,* which provides general information on this subject, and Resource Report 1, which is a directory of all micrographic standards.

While this collection of material relates specifically to the IRS revenue procedure, it should also be of value to anyone developing or operating a micrographic system, particularly if he is concerned with archival permanence, the association said.

Selling price of the package is $8.50 for NMA members and $11 for nonmembers from NMA, Publications Sales, 8728 Colesville Road, Silver Spring, Md. 20910.

DP Capacity Quadrupled

(Continued from Page 50)

nience.

The system also provides online capabilities which make it possible to achieve a 100% improvement in programming productivity and efficiency, he claimed.

"Students and faculty now have direct on-line entry to the system, making it considerably more accessible to them," he explained. "Access is also easier because there is less to learn on the part of the user. In addition, turnaround times for use working with the system in a batch mode are reduced from as much as 24 hours to three hours.

Capability to Expand

"We also have the capability to expand without any conversions or the need for a proportional increase in staff," Schueppel said. "The system is upgradable to meet our needs over the next five years through four or five additional steps, including doubling of the main memory. At the same time, the system provides more efficient operating capabilities which will minimize the need for additional personnel as growth takes place."

Under the direction of senior programmer Edward C. Sheard, who served as project leader, conversion to the new system began in August 1976, with the aid of Univac, which provided on-line access to a remote-job test facility in Blue Bell, Pa., as well as equipment and personnel. Installation was begun in October and the system was accepted in January 1977.

Consisting of a 1M-byte main memory, four 100M-byte disk drives, four 9K-byte tape drives, a 1,400 line/min printer, a 1,000 card/min reader, a 300 card/min punch and multichannel communications controller, the 90/60 system is operated with six Uniscope 200 CRTs and eight asynchronous terminals.

Four of the CRTs are used internally for on-line administrative programming and two are operated in the computer center for on-line student and faculty use. The eight asynchronous terminals provide on-line service to students and faculty at the college's technical center. In addition, batch facilities previously operated in the computer center are being retained for use in problem-solving modes and by beginning students.

Automated Library Cuts Labor Cost

(Continued from Page 49)

California Computer Products, Inc. (Calcomp) 7110 automated tape library, which began test operation on April 15. Since that time, the 100 ft-long unit, which holds 8,351 magnetic tape reels, has averaged between 98% and 99% uptime, Ballard said.

Besides the mainframe itself, the mostly IBM configuration incorporates three 1403 line printers, model 2314 disk drives and Itel Corp.7330 disk drives.

With this configuration, Almsa can store in the Calcomp automated library most of the reels that originally resided in the tape rack. This proximity to the drives has eliminated the manual transporting of magnetic tape from room to room and many of the "runners" who had been hired to perform that chore, Ballard said.

The current system also allows the Almsa DP staff to mount a tape within 12 seconds of the time the reel is requested, he added. And when the programming house finishes writing some "optimization software," mounting times will shrink even further to about five or six seconds, Ballard said.

Monitors Tighten Jobs

(Continued from Page 54)

monitors, however, he said. They add system overhead on the CPU, channels, devices, memory and other components; the monitor is unable to run a test on itself; there are periodic maintenance and software fees on some; and they are incapable of some specific measurements, according to Raine.

Software monitors also lack the ability to define and measure concurrent events, he said.

Despite the drawbacks, Sanders was able to detect a 40% overstatement during the week from the on-line IMS/TSO application and an 8% overstatement on the weekend shift, when the system was running in a batch mode, he said.

"I thought it was about a 10% error factor, but the monitors demonstrated there was a 50% error factor of total CPU time," Raine said, recalling Sanders' test results.

Datek Releases Printer Books

FITCHBURG, Mass. — Datek of New England has published two books describing the printout devices shown at the National Computer Conference in Dallas and at the Hannover Fair in Germany.

The booklets, *Printout NCC '77* and *Printout Hannover '77*, each contain 24 pages of photos, technical information on printers, background on the shows and an address listing of all the firms exhibiting printout equipment.

The booklets cost $15 each from Datek at 150 Main St., Fitchburg, Mass. 01420.

Tapes Improve Medical Billing

(Continued from Page 51)

format errors.

The hospital has recently implemented another magnetic tape system in which inpatient and outpatient claims are submitted to the Massachusetts Department of Welfare. The system bills in-house patients in 30-day intervals as well as complete welfare billing for both state and hospital end-of-years. Claim payments are being made in three weeks instead of the previous time of two to three months. The one-time reduction in accounts receivable is expected to be nearly $80,000.

The programs and reports are similar to the Blue Cross and Medicare systems.

The introduction of magnetic tape has expedited the hospital's combined cash flow for Blue Cross and Medicare A outpatient reimbursement from approximately four weeks to seven days. The hospital's ability to edit for format errors has reduced the paperwork of claims in error to a negligible number. Other savings to the hospital are additional storage space availability and a decrease in CPU run time.

The use of magnetic tape for submitting Massachusetts Department of Welfare claims is significantly reducing the hospital's accounts receivable as cash flow has gone from three months to three weeks.

The patient benefits financially as the hospital, Blue Cross, Medicare and the welfare department attempt to control costs. Also, elimination of third-party delays due to format errors results in less patient confusion, sometimes caused by the receipt of hospital bills which are expected to be paid by the third party.

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Path for 399, 499 Users

NCR Unwraps I-8100 For DP Novices

By Esther Surden
CW Staff

DAYTON, Ohio — NCR Corp.'s introduction of the T-8100 series of interactive small business systems last week clarified that company's commitment to inexperienced computer users previously served by the firm's 399 and 499 ledger card systems.

In about the same price range as the 399 and 499, the two members of the I-8100 series are on-line, interactive, transaction-oriented systems that are compatible on the object code level with the firm's mid-range and large-scale systems. They are in the IBM System/32 and Burroughs B80 class of systems, NCR said.

The I-8130 and I-8150 can also be used as nodes in a distributed processing network functioning under the company's Distributed Network Architecture or using binary synchronous communications.

Several of the systems can share the same files, NCR noted, adding a file lockout feature protects files under this scheme.

Both models run programs written in Ansi Cobol 74. A variety of industry-oriented application packages designed for installation on a load-and-go basis will be available. No provisions for user modification of these programs have been made, the firm said.

No Direct Upgrades

Present NCR 499 uses will not be able to upgrade directly to the systems, a spokesman admitted, but the company reportedly plans to support the 499 for as long as it is still a viable product.

An optional visual record printer is designed to appeal to those who still require ledger cards or cut forms, NCR said.

Each of the I-8100 systems is built around three distinct microprocessors, distributed within the system according to function. As features are added to the system, more micros are added, another spokesman pointed out.

The basic version of the I-8130 includes the multiple processors with 48K bytes of memory, two floppy disk drives that can store up to 1M bytes of data, a 50 line/min bidirectional matrix printer and a 9-in. CRT.

This system is not user-programmable; it will, however, run programs compiled on the I-8150, NCR said.

Memory for the I-8130 is expandable to 64K bytes and users can add more floppy disk drives, cassette tape units and a range of printers, the spokesman added.

The I-8150 differs from the I-8130 in storage. It includes a 5M-byte integrated fixed disk and a cartridge tape drive that can accommodate up to 2.5M bytes of storage. Up to 40M bytes of disk can be added to the system, according to the spokesman.

Several features have been designed with "human engineering" in mind, still another spokesman noted. The CRT, for example, features characters that are "about 25% larger than on a typical CRT."

A restart protection option allows users to power up after an outage at the same point processing was interrupted, he said.

Both systems and applications software are unbundled, the company noted. Operating software for the system is called the Interactive Direct Processing System and, according to NCR, programs written under it can be transported to larger NCR systems running under the Interactive Multiprocessing Operating System and the Interactive Resource Executive.

Announced for use with the I-8100 series was the Model 7281 CRT, suitable for remote inquiry device or remote data entry. "It operates like a key-to disk system" with valid transactions written to disk all at once, a spokesman said.

Industry application packages will be available in the first quarter of 1978 for the I-8130 pictured here.

Industry application packages will be

(Continued on Page 60)

DEC Enhances PDP-8 Line

MAYNARD, Mass. — Digital Equipment Corp. has enhanced its established PDP-8 minicomputer line by adding three more PDP-A processors and several options that effectively expand to 128K bytes the amount of memory users can have.

Prior to this enhancement, the processors could only handle 32K bytes of memory, a spokesman noted. The enhancements therefore provide users with up to four times the amount of memory previously available.

The three processor models introduced were the basic PDP-8A/205 system; the PDP-8A/425 system, based on a single-board 1.5 microsec CPU; and the PDP-8A/625, based on a multiple-board 1.2 microsec CPU.

Memory Management

The KT8-A memory management option that allows the systems to address the expanded memory sizes can be added to present PDP-8A configurations using more than 32K words of core, DEC noted. Another option, the MS8-C, a MOS memory module, is available in both 16K- and 32K-word configurations and uses 4K random-access memory chips.

The KT8-A and MS8-C modules are also available to present PDP-8A users who wish to upgrade their systems to 128K bytes, the firm noted.

Users can mix core and the MOS memory on their systems, the spokesman added. This allows a user, for example, to keep programs in nonvolatile core and expand the data base in MOS, he explained.

The systems are software-compatible with previously available PDP-8/A systems, DEC said. The KT8-A option features extended virtual field addressing, memory protection and reduced operating system overhead, the spokesman claimed.

The 16K-word PDP-8A/205 costs $3,900; the 128K-word PDP-8A/625 costs $18,050. The 16K- and 32K-word MS8-C memory modules cost $1,900 and $3,100 respectively.

Deliveries of the processors will begin in November, DEC said from Maynard, Mass. 01754.

DDP Flies Savings To Air Cargo Firm

By Esther Surden
CW Staff

STAMFORD, Conn. — Distributed data processing (DDP) is paying off in improved customer service, freight consolidation cost reductions and reduced paper work at Air Express International Corp. here, according to the firm's DP manager.

Air Express's distributed system now includes three Four-Phase Systems, Inc. minis and one IBM 32, Bill Romano said. The systems are not linked together nor do they communicate to the company's mainframe system. Information is spun off to tape or written on floppy disks which then are

(Continued on Page 60)

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APL Unit Based On DEC Micro

HARTFORD, Wis. – The APL/X3 from General Robotics Corp. (GRC) is an APL system based on the Digital Equipment Corp. LSI-11 CPU.

Packaged in a 16-slot backplane with 28K words of MOS memory and including an extended instruction set and floating-point arithmetic, the unit runs under DEC's RT-11 and APL/RT-11 operating software, GRC said.

Also included with the APL/X3 is an APL CRT with 24 lines of 80 characters, full overstrike capability and an APL printer that operates at 60 char./-sec.

Enclosed in a "data desk," the system costs $27,500 from GRC at 57 N. Main St., Hartford, Wis. 53027.

Turnkey Does Warehouse Jobs

BEDFORD, Mass. – Distribution Management Systems, Inc. (DMS) has an on-line warehouse inventory and operational control turnkey system that can be configured with either the Digital Equipment Corp. PDP-11 or IBM Series/1 minis.

The system provides tools and facilities for picking and packing, inventory location and control, shipping and receiving, personnel performance, warehouse management, reporting and communications with a centralized order entry system, the firm said.

The unit keeps a map and count of all items and directs shipping and receiving through a cost-optimized routing process, DMS said.

The turnkey costs about $75,000 for a system using either the DEC or the IBM processor with 96K bytes of memory, three terminals (one of which produces hard copy, a 180 char./sec printer, two disks with a total capacity of 10M bytes and some communications capability. The company can be reached at 11 DeAngelo Drive, Bedford, Mass. 01730.

DDP Delivers Savings to Firm

(Continued from Page 59)

transferred to the host system.

The company is using the distributed systems to help consolidate the freight it carries. Air freight companies compete with airlines for freight business and charge competitive prices. But they offer additional service. Air freight firms will pick up freight at a customer's location and deliver it to its destination within a set period of time, according to the rate a customer pays.

"We make our money in consolidating your freight with other people's" Romano explained. The consolidation process, formerly done manually, is now controlled by the small systems.

The systems print out lists of freight according to assigned flight – in proper sequence – and an interim manifest is created. From this, workers can locate the freight and put it with the correct cargo going on the same outbound aircraft. After this operation is completed, an operator updates the system.

"We like to close out a flight as late as we can and the computer allows us to prolong the closeout," he emphasized.

A printout of the final manifest goes to the individual airline carrying the cargo to satisfy all their flight regulations.

Very soon the company will have another application running on the small systems. They will prepare "international house bills" which satisfy customs and other unique requirements of destination countries.

The distributed sytsem has been "clearly justified," Romano stated. "We have a well-established central computer facility," but it "is basically sequential in nature," he explained. The system couldn't support the processing at the operational end of the business, so the firm decided to "go the path of least resistance" and give the users their own system.

Before settling on the Four-Phase systems, the company investigated a number of different vendors, Romano said. The ANS Cobol "on a rental-based system at a reasonable price" turned the tide toward Four-Phase. The company's IBM 32 was selected because there was an application package written for it that the company wanted.

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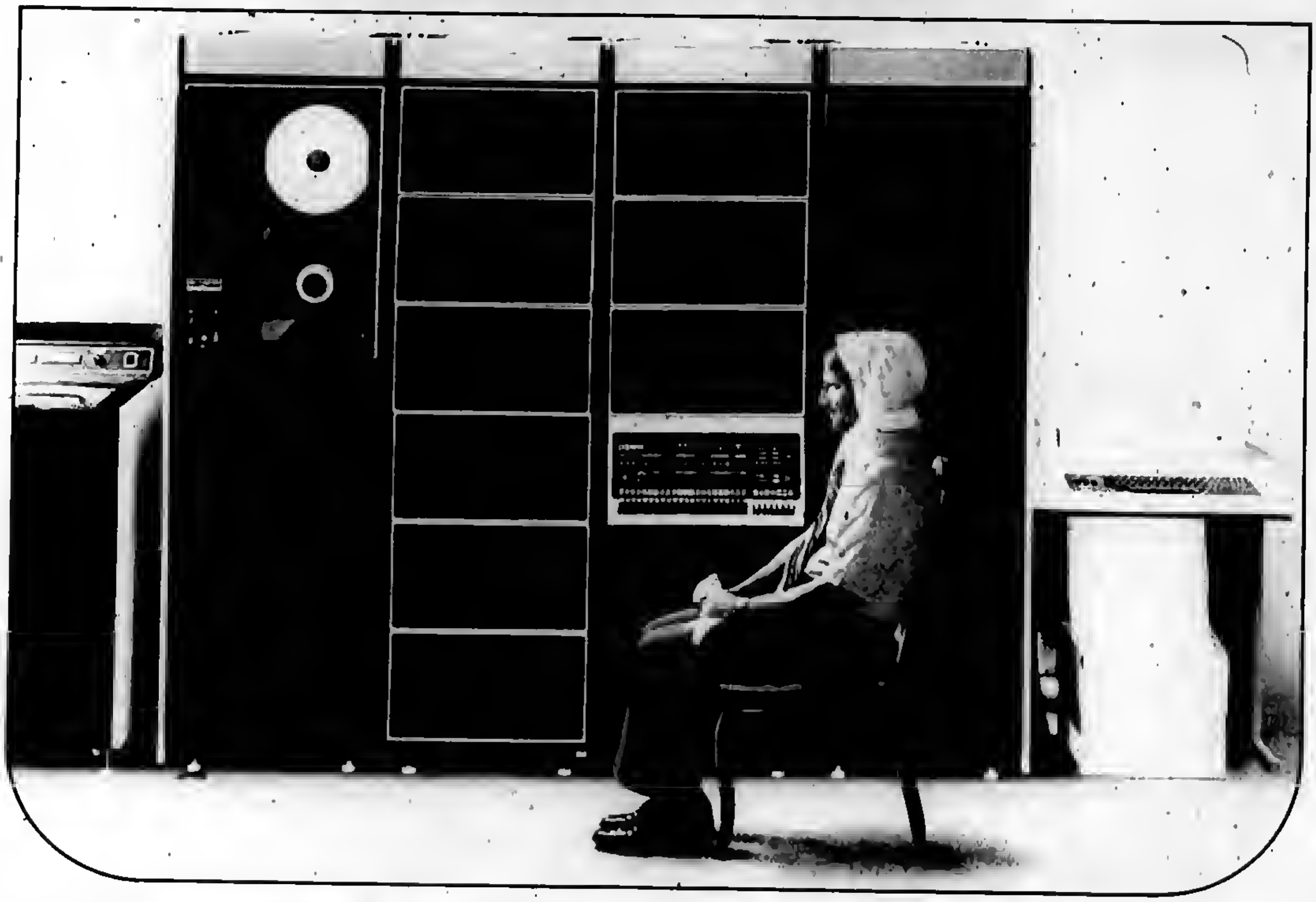

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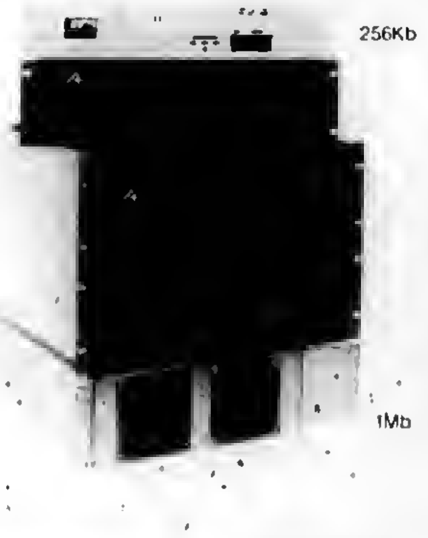

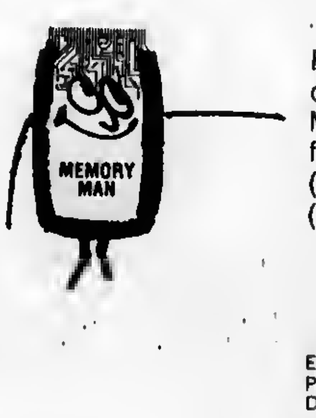

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NCR Has I-8100 For DP Novices

(Continued from Page 59)

available in the first quarter of 1978 for manufacturers, wholesalers and distributors, restaurants and educational, governmental and health care institutions. General accounting applications such as payroll, general ledger, accounts payable and accounts receivable will also be available in packaged form at that time.

The I-8130 operating software is licensed at $60/mo while the I-8150's costs $70/mo. The Cobol compiler has a fee of $30/mo. Application package fees range from $25- to $90/mo.

The basic I-8130 carries a $19,970 price tag and the I-8150 costs $29,200. Monthly rental prices are $656 and $831 respectively on a three-year agreement.

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Users' Prayers Answered by Network of Minis

By Ann Dooley
CW Staff

MILWAUKEE — The Sisters of the Sorrowful Mother, a religious order here, is devoting a minicomputer network worth over $1 million to administration work in 16 hospitals throughout Wisconsin.

Six of the hospitals are operated by the nuns, while the other hospitals have contracted for the order's DP services. The hospitals range in size from 60 beds to 420 beds.

The DP work was previously done by batch processing using non-intelligent terminals, but as the hospitals grew larger they required more sophistication, according to Paul Solberg, director of DP.

The decision to go to a mini system was made about a year and a half ago in order to give the hospitals better and more timely information, Solberg said. The system was also expected to give them more local control for their specific needs.

The system now includes dual central NCR Century 201 mainframes, CRTs, a 300 line/min printer with integrated cassettes, an NCR 8200 in four hospitals and a Model 736 magnetic tape encoder for key-to-tape terminals in one hospital. It also includes 10 NCR 7200 terminals for off-line data entry on key-to-tape sets.

Review Not Detailed

Some system review took place at the time of the changeover to the minicomputers, but it may not have been as detailed as it should have been, Solberg admitted.

"We had some immediate needs to fill and the 8200 came out on the market at the same time, so we used it," he recalled.

The order is currently investigating smaller terminals for those hospitals not already on the 8200s and hopes to have them installed by next spring, according to Solberg. The smaller hospitals don't need as much sophistication, which should keep costs down, he added.

The system handles such applications as inpatient/outpatient records, accounts receivable, payroll, general ledger and medical audits. Most of the applications are performed in the same way, Solberg said.

All the relevant information is batched. The data is keyed into the 7200 data entry terminals and put onto cassette tape where it is automatically transmitted to a disk file.

The minicomputers have been programmed to put all the individual transactions onto one major transmission file and send the file to the Milwaukee center. This procedure is done on a daily basis, Solberg said.

At the DP center, the data is processed and put into a master file. All the necessary report material for the hospitals is then generated and transmitted back to the hospital. The reports also indicate what kinds of reports should be printed at the specific hospital.

The reports are printed at each hospital since the selection process is different for each one, according to Solberg. In this way, the hospital can have customized reports.

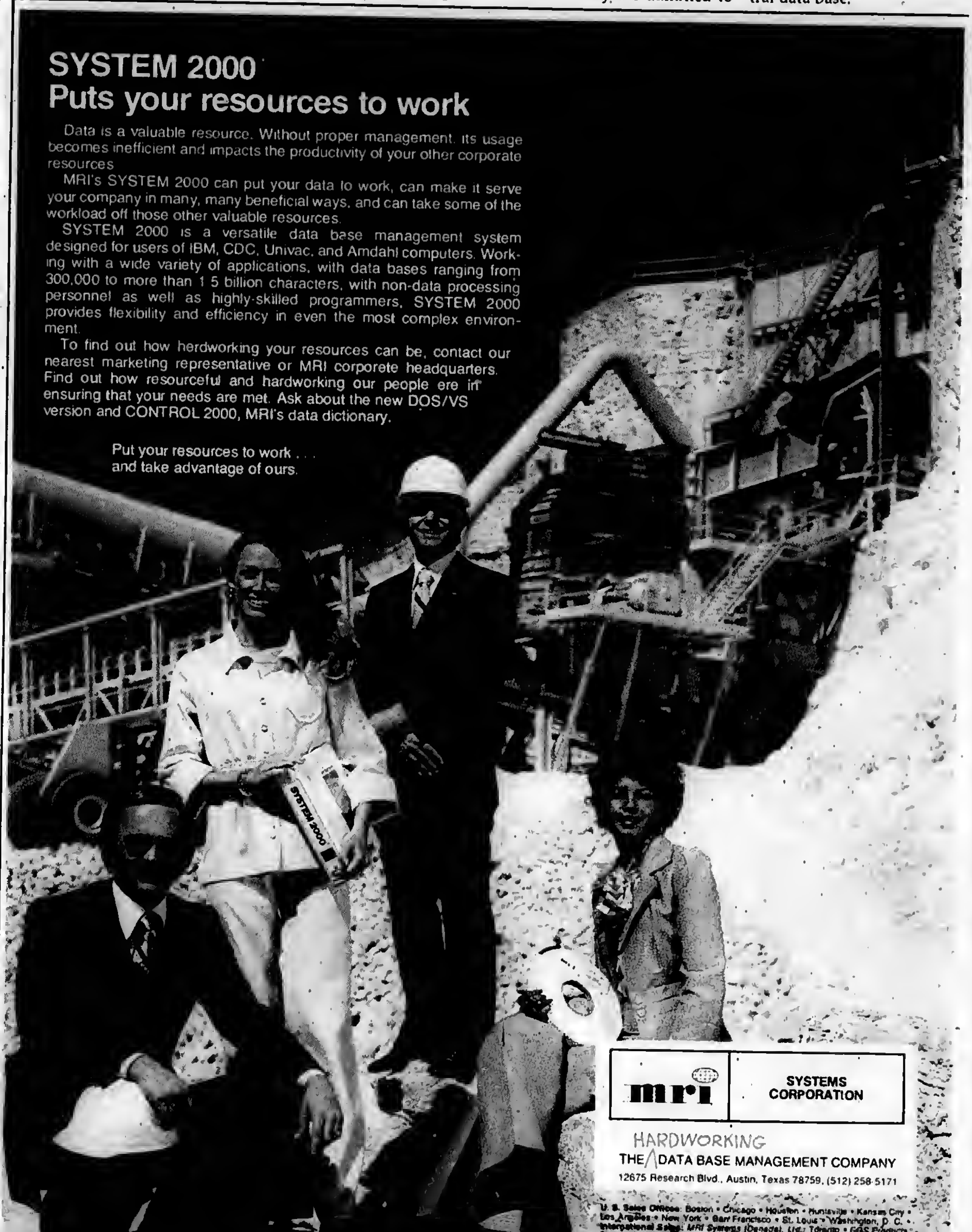
The center keeps a two- or three-day backup on all the data, he added.

Separate Data Bases

A mini data base has been incorporated at each hospital with an 8200 so these hospitals can have some inquiry capability. Eventually, the plan is to follow patients from the time they are admitted to the time they are discharged.

As they come in, the information from the CRT would be transferred to a disk file automatically. In this way, all information on a patient can be kept in one file and handled directly at the admissions office.

The hospitals would continue to transfer any data to the center, which would require a mainframe capability, for needed upkeep of the central data base.



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Gives More Control, Security

CPA Firm Finds Going In-House Makes Change

WELLESLEY, Mass. — Better control, tighter security and faster turnaround — those are the reasons many users give for switching from a service bureau to an in-house system.

The Wellesley office of LaFrance, Walker, Jackley and Saville here is one such user, according to the partners in charge.

Small to medium-sized manufacturing, trading and other concerns comprise the main portion of the CPA's client base.

When asked why a small firm of certified public accountants (CPA) would consider an in-house computer, Charles Morse, one of the partners, explained, "Our primary reasons was to improve turnaround time on clients' information."

The principal workload of the firm is general ledger and financial statement preparation. Information is input from footed journals, which are totals from the clients' various journals. This input is then used to prepare the general ledger and, as a by-product, a financial statement.

Time is often a critical factor in this operation, according to Morse. "Sometimes governmental agencies, banks, lending institutions or boards of directors have very critical time deadlines by which they must see information.

"Security is also very important," he added. "We do not like client information leaving the office."

During a typical working day, a member of the firm travels to a client's premises and meets with the client's bookkeeper or clerk who has prepared posting journals from the books of original entry.

Several hours are spent checking that information and preparing corrected or updated entries. The results are then brought to the accounting office, where the general ledger and financial statements are updated and completed.

"Before we purchased our Wang Laboratories, Inc. system, we relied on an outside service bureau for general ledger and financial statement preparation," Morse said.

"We were using an optical font adding machine at our office," he continued. "This produced computer-recognizable numbers which were scanned optically at the center. These were then converted to magnetic tape, which was sent through the computer.

"This process typically involved a five- or six-day waiting period, just to get our information returned. Sometimes we received information back and found we had to make a change either because of a client error, our error, a service bureau error or because the computer made a mistake.

The CPA firm went in-house also because "we felt in the long run we would realize a dollar saving," Morse said. "The cost of the outside service bureau would be approximately equal to what we would be spending to amortize our own system."

Now when a client's information is brought to the firm on a series of posting journals, it is input into one of the floppy disks of the Wang WCS-20 system. That information is then integrated into the previous history record (which was stored on the client's disk) and an updated history record is produced.

The system then runs off financial statements, such as a balance sheet or income statements.

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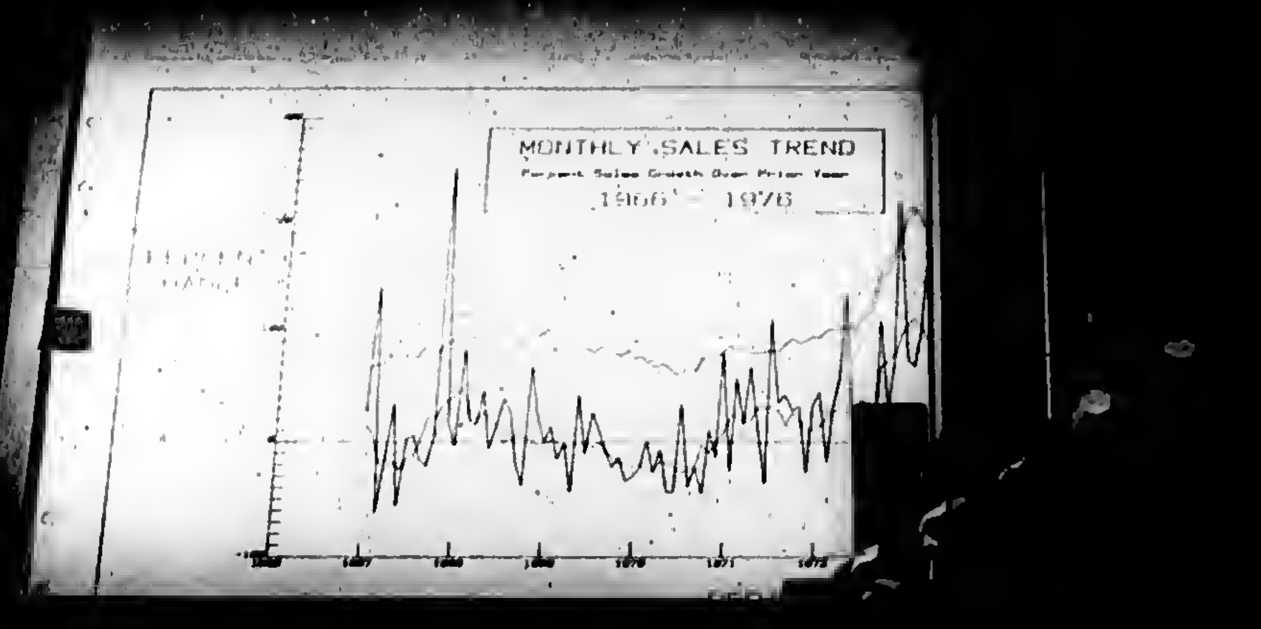

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L&W Unveils Process Control CPU

NORTH WALES, Pa. — Another process control CPU is available from Leeds & Northrup Co.

The Memory Management CP400 processor contains hardware for memory mapping. The system's memory is expandable to 128K bytes. The unit is designed for use in the firm's LN5400 system, a spokesman noted.

The system is said to "meet the need for larger and more complex programming for real-time process control applications; and it reportedly reduces address space conflicts, bulk waits and thrashing situations.

The processor is made up of two dedicated units. One is devoted to I/O functions, while the other performs regular CPU operations. The system features a real-time clock and power fail detection. Standard software includes executive, I/O, background, utility and application programs, the firm said.

Although the company could not pin down a price for the system, it said prices range anywhere from $500,000 to $3,000,000. Delivery is from nine to 18 months, he said.

The Leeds & Northrup Co. Systems Group is located on Dickerson Road, North Wales, Pa. 19454.

Cache Unit Fits PDP-11/34

SANTA ANA. Calif. — Able Computer Technology has a cache buffer for the Digital Equipment Corp.

Most software consists of reiterative loops or subroutines, the vendor explained. Cache/34 is designed to use a "write-through" algorithm for all computer read-from-memory operations. A 1024 block address and the corresponding data are mapped into the cache so that, on subsequent operations, data is supplied by the buffer for any address which has already been mapped, Able noted.

The unit is contained on a single circuit board. It installs in "less than five minutes" Able claimed, and requires no adjustments or software changes. A switch on the board permits a choice of either on-line or off-line operation, the vendor added.

The unit costs less than $4,500 Able said from 1616 S. Lyon St., Santa Ana, Calif. 92705.

System Bows

CHARLESTON HEIGHTS, S.C. — A small business system based on the Intel 8080 that is designed for small retailers, doctors offices and the construction industry is available from ComputerCo., Inc.

The system includes the CPU with 32K of random-access memory, 179.2K of storage on floppy disk drives, a CRT input terminal and a 132-column matrix printer. The system can be upgraded in storage, memory size and printer speed, the company noted.

The unit costs "less than $12,000" excluding shipping and is available in 60 to 90 days from the firm at 5849 Dorchester Road, Charleston Heights, S.C. 29405.

Plessey Unwraps Signal Processor

SAN FRANCISCO — The SPM/02/11 from Plessey Microsystems is a fast fourier transfer signal-processing peripheral designed for use with Digital Equipment Corp. PDP-11 minicomputers.

The SPM-02/11 add-on package is configured as a peripheral to a host PDP-11 mainframe with all data transfers taking place under direct memory access (DMA). Interface to the 'unibus' is via a standard DMA interface card.

Software control of the module is achieved through the use of programmed requests when programming in Macro-11 Assembler language or system subroutine library calls when programming in Fortran IV, the vendor said.

The SPM-02/11 may be used with any of the PDP-11 range of computers using RSX-111 or RT-11 operating system.

The complete system, including software, is $9,200 from 1641 Kaiser Ave., Irving, Calif. 92714.

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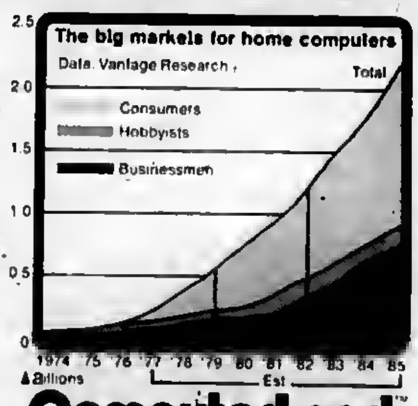

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Mini-Based System Aids Architectural Planning

By Mary O. Stewart
Special to CW

BOSTON — Minicomputer-aided design is helping Clifford Douglas Stewart Associates here provide a range of services aimed at allowing architects to design what is needed where and when it is needed.

The architectural/planning concern offers the use of its computer-aided design center to architects from other firms and also uses the system for its own work.

The company developed these services in order to help solve three problems in the construction industry: the great demand for construction, the shortage of experienced design specialists and the reduced time span within which to provide these services.

Range of Services

The services provided cover a broad range. The system can help survey and map large areas to find appropriate building sites. The computerized data base contains information on the various characteristics of each area's natural resources. Selected criteria governing the potential use of land or selection of alternate sites can be displayed graphically.

The user selects the limits of interest within the appropriate criteria and a multitone map is plotted in up to three colors.

It can be used to analyze the socioeconomic forces in an urban environment. A variety of data is entered into memory and used selectively to generate shaded maps showing factors important to the planning effort. From basic plots, additional overlays can be requested of the computer until the final maps illustrate new considerations.

Details Space Needs

The system develops detailed listings of the space needs and planning requirements for educational, health or industrial facilities. At the same time, lists of equipment, staffing profiles and construction estimates can be compiled. For every space type in the building, a listing is maintained of the equipment and furnishings normally found in that space. This program delineates the description (including manufacturers); the required clearance dimensions, and the electrical, plumbing, gases and exhaust requirements.

For each piece of equipment listed, there is a scaled drawing that can be called from memory, displayed on the CRT and plotted in design or working drawing form on the plotter. Additional pieces can be added and simulations of movement and flow can be created dynamically and recorded.

Program Assembly

The space program for a project can be assembled from the basic library in minutes, presenting the required area and the probable construction cost, escalated to bid date, for each major component of the program separated by phase of construction. Each edit of the proposed basic spaces illustrates the new relative cost, efficiency and staffing requirements.

The most efficient layout of space can be discerned from computer-aided matrix analysis. The computerized approach eliminates the need for broad assumptions and guesswork in the site planning and interior layout of complex building. From a numerical code matrix representing the ideal relationship between each of the functions, the system generates a diagram of the ideal physical relationships. It then transforms the "bubbles" of the ideal diagram into exact scale rectangles of the correct dimension which the designer will arrange interactively on the CRT to form a proposed layout.

Independent PDP-15s

The systems behind these services are two Digital Equipment Corp. PDP-15s. The two minis stand side by side, but are completely independent. Each has 32K of core, disk cartridge drives, and an interactive graphics workstation consisting of two CRTs, one with electronic tablet and spark pen, and a Versatec dot printer/plotter.

One system has a California Computer Products, Inc. (Calcomp) 36" three-pen plotter, for producing final ink drawings. Backup is done on magnetic tape and data can be transferred between these and other similar systems on Dectape.

DEC Maintenance

One of the two PDPs was purchased new from DEC. The other was purchased used. DEC maintains them both, including the Versatec and Calcomp plotters. Early in the development of the system, peripherals were purchased from and maintained by different manufacturers. This approach resulted in a lot of fingerpointing and time-wasting, trying to determine which piece of equipment had failed, and therefore which manufacturer was responsible for correcting the problem. Maintenance of the entire system by DEC resolved the problem of determination of responsibility.

The systems are used mainly by architects, not by programmers or other computer-oriented personnel. They are not in a very controlled environment, cigarettes and coffee are not forbidden. While this does occasionally cause a problem, it also results in greater acceptance of three- or four-hour-long work sessions at the workstation.

Stewart is computer systems manager at Clifford Douglas Stewart Associates in Boston.

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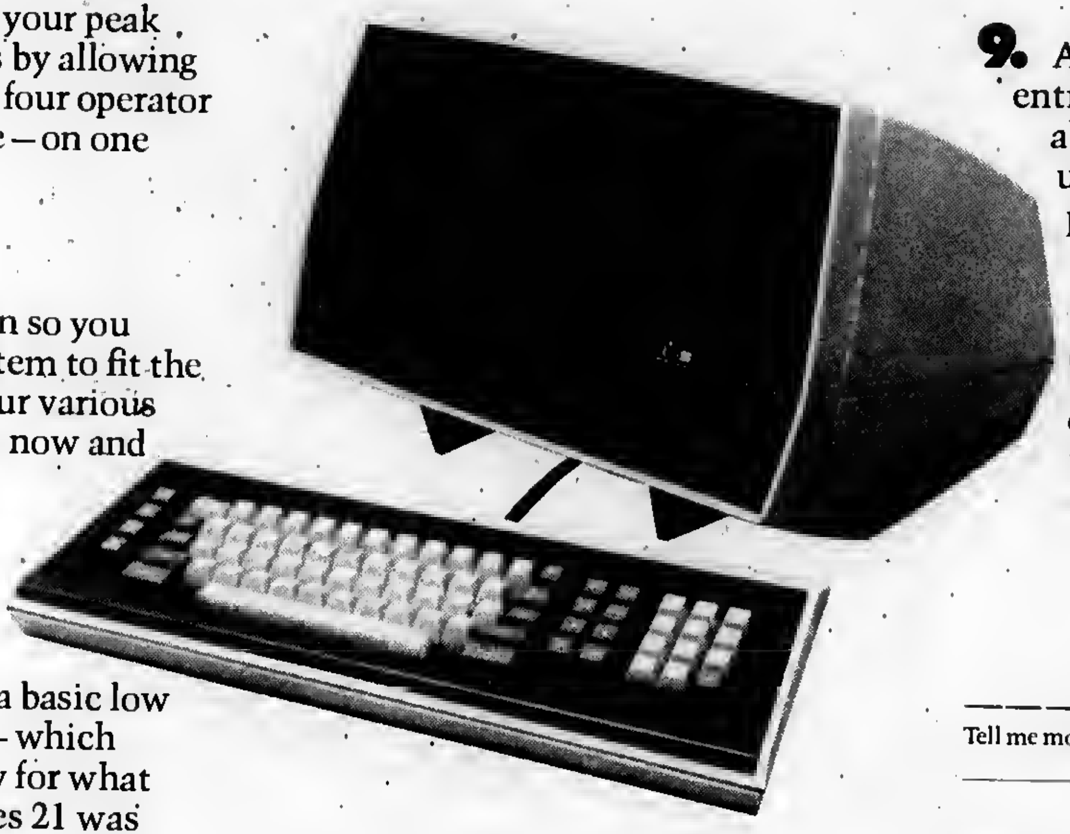

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Replaces Isolated I/O

Memory-Mapped I/O Found Flexible

SAN FRANCISCO — It has been proven over the years that memory-mapped I/O is an extremely flexible I/O-handling architecture, according to a paper presented at a recent conference.

The paper, "Addressing Peripherals as Memory Locations," by Michael Gooze of Motorola, Inc., looked at the approach of memory-mapping I/O handling in microprocessor-based systems.

"Addressing peripherals as memory locations, now commonly referred to as memory-mapped I/O, is a relatively new I/O-handling architecture, first made popular by the PDP-11 line of Digital Equipment Corp. minicomputers," Gooze said.

Until the advent of memory-mapped I/O, the common technique in use was isolated I/O. This technique is still used in many computer systems because it is simple, he said. "Utilizing this approach, I/O devices communicate directly and only with the accumulator of the MPU. In general, the total I/O instruction set consists of an IN instruction and an OUT instruction," he noted.

8080 Cited

Often, the number of addressable I/O locations is significantly less than the total memory address space. The 8080, which he cited as an example, has 65K of memory address space but has only 256 I/O addresses and additional I/O locations require external hardware.

The memory-mapped I/O approach is an I/O-handling technique in which peripheral I/O devices are treated the same as memory locations, he said. All peripheral devices "hang" on the same address and data bus as do memory devices. Each device is given a unique address in the memory field. Access to a particular device is then obtained by addressing the exact location (address) in the address field which has been assigned to that individual device, he said.

By treating I/O devices as memory, optimum flexibility is obtained, and the technique allows all memory-oriented instructions to be utilized for peripheral handling.

In many cases, system debugging is made easier with memory-mapped I/O because of the ease and flexibility with which peripheral devices can be directly accessed, he added.

Four Extended Basic Packages Released

MARQUETTE, Mich. — The Software Store here has introduced four Mits Disk Extended Basic compatible software packages.

The Disk Sort package supports fixed or variable-length sequential files of any size and will sort or merge on any number of keys anywhere in the record, according to the firm. It has an interactive generator that allows the user to define a customized sort/merge program for each task.

Multiple sort/merge tasks can run unattended with user-defined job-stream links, the spokesman said, giving the example of being able to sort 12 files, merge them with another sorted file and link to the report program.

Memory and disk space are managed by the system to minimize processing time, the spokesman claimed.

Interacts With Operator

The firm's Universal Data Entry (UDE) system interacts with the operator to generate custom key-to-disk modules, he noted, adding that user-defined displays can provide "fill-in-the-blanks" simplicity for data entry operations.

Validation procedures such as check digits, value tables, range tests, batch totals and record counts improve data quality, he claimed. Selectable field duplicate or increment is available to eliminate repetitive entries, and the UDE supports both fixed and variable-length disk files.

The Disk Fix system recovers data and program files that were lost as a result of DISK I/O ERROR and FILE LINK ERROR, the firm said. Disk Fix provides an automatic mode for rebuilding files and the file directory. In manual mode, the user can examine or rewrite any sector of an unmounted diskette, the spokesman said, noting that the selected sector is displayed in both decimal and controlled Ascii with all system overhead labeled.

Disk Fix provides the alternative to reentering entire programs or data files, he claimed.

The firm's Word Map system adds word indexing to its Mini Word Processing (MWP) system. Text and name/address fields created by MWP can be cross referenced, the firm claimed.

Word Map is used for indexing text, detecting misspelled and over-used words, deleting duplicate name/address entries and cross referencing Basic or Assembly language programs, it was reported.

Word Map allows the user to choose the input file, minimum word length to index and the output device. It is unnecesary for the user to specify a list of words to occur as the system limits any word to 120 indexed occurrences, the spokesman said.

Disk Sort and Universal Data Entry cost $195 each, while Disk Fix and Word Map sell for $95. All software comes with a users manual. The Software Store is at 706 Chippewa Square, Marquette, Mich. 49855.

Want to Swap?

TULSA, Okla. — A user of the RCA Model CDP1802 microcomputer is planning to publish a listing of available software for the unit.

Persons desiring either to give away or to sell software for the CDP1802 are asked to provide Ross Wirth with a listing for review. The booklet will provide a description of the software and cost information with a reference number corresponding to a number on an order coupon, Wirth said.

The booklet will sell for $1 per copy and advance orders, software listings and other questions should be directed to Wirth at 1636 S. 108 East Ave., Tulsa, Okla. 74128.

Book Provides Tips On Micro Makeup

NEW YORK — Coverage of the various types, languages, design software and applications of microcomputers is provided in Microprocessors and Small Digital Computer Systems for Engineers and Scientists, recently published by McGraw-Hill Book Co.

In his book, Granino A. Korn provides a survey and comparison of available microprocessor systems and microprocessor-based minicomputers. He also covers the different I/O interfaces and interrupt circuits, including how they affect programming.

In addition, the book provides tips on Assembly language and the use of macro for writing "homemade" languages for special applications; a discussion of software systems and microcomputer prototype development systems; and reference guides to Extended Basic and PL/M microcomputer languages.

The book sells for $24.50 from the publisher at 1221 Avenue of the Americas, New York, N.Y. 10020.

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'Bugbooks' Offer Lessons On 8080A Programming

DERBY, Conn. — A two-volume course that integrates introductory experiments in digital electronics with lessons in programming and interfacing an 8080A-based microcomputer is available from E&L Instruments, Inc.

Bugbook V and *Bugbook VI* by D.G. Larsen, P.R. Rony and J.A. Titus are lab. experiment-oriented texts that together comprise 23 instructional chapters or units totaling 870 pages.

The paperback books in the *Bugbook* series are intended for study and guidance in the performance of hands-on experiments with the aid of a microcomputer, breadboarding kits and readily available components, according to a spokesman.

Organized for Teaching

The course material is organized for teaching microcomputer programming and the interfacing of a microcomputer to external digital devices for practical applications. The hobbyist is expected to perform the suggested experiments to obtain the most benefit from the course material, the spokesman said.

Integrated circuits and the microprocessor are treated as functional black boxes with specific electrical characteristics; semiconductor physics and mathematical analysis are omitted. Laboratory experiment and text review questions and answers are included to test reader understanding of the subjects covered, he added.

Bugbook V with 15 units in 493 pages covers the basics of 8080A microcomputer programming and instructions as well as digital codes, registers, logic gates and truth tables. An introduction to breadboarding is followed by instructional units and experiments covering 7400 series TTL integrated circuit chips including flip-flops and latches, decoders, counters, digital signal gates and mulivibrators, he said.

Bugbook VI has eight units in 490 pages; it integrates the digital concepts discussed in *Bugbook V* into a treatment of 8080A microcomputer interfacing and programming.

Detailed instructions and related laboratory experiments cover select pulses; the 8080A instruction set; three-state busing techniques; and introductions to accumulator and memory-mapped input/output techniques.

Other Topics

Other topics in *Bugbook VI* include advanced input/ouput concepts and interrupt servicing.

Complete appendixes for both volumes at the back of *Bugbook VI* include references, definitions and descriptions of available breadboarding accessories and microcomputer recommended for use in the experiments.

Bugbook V and *Bugbook VI* are priced at $9.50 each, from E&L at 61 First St., Derby, Conn. 06418.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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In Brief Backing Calcomp Ruling

IBM Says Pricing Not Monopoly Factor. . .

By Molly Upton
CW Staff

SAN FRANCISCO — IBM's methods of introducing new products and lowering prices are indicative of the competitive nature of the DP industry, not of any exercise of monopolistic powers, according to an IBM brief recently filed with the Ninth Circuit Court of Appeals here.

The document was filed in response to an appeal by California Computer Products, Inc. asking that the directed verdict which ended its antitrust suit against IBM be overturned and that a new trial be granted [CW, Sept. 5].

"This case exists because IBM has reacted to [the challenges of the marketplace] with better products and lower prices of its own — as it was forced to do by its accelerating loss of business. That is competition, not monopoly," the IBM brief stated.

No Evidence

Calcomp failed to furnish any evidence from which a jury could conclude that Calcomp was damaged by any act of IBM forbidden by the antitrust laws, IBM contended.

Furthermore, Calcomp failed to prove that a relevant market existed and that IBM has monopoly power, IBM said. It also failed to make a prima facie showing that it suffered injury.

Even if Calcomp had sustained such an injury, there was insufficient evidence to provide a factual basis for a reasonable computation of damages, the brief continued.

The IBM response dismissed the amicus curiae, or "friend of the court," briefs of the Justice Department, Memorex Corp. and Transamerica Computer Corp. The latter two did not address the record in this case and are irrelevant, while there is no necessity to remand the case to the district court as suggested by the Justice brief, IBM said.

Much of the IBM brief is devoted to the issue of what constitutes illegal pricing under antitrust laws, the same issue addressed by Memorex and Transamerica. IBM maintained its price reductions were substantially profitable and thus not "forbidden by the antitrust laws."

"Even if Calcomp is correct that profitable price competition may be forbidden by the antitrust laws under unusual circumstances, there is no evidence of such circumstances in this case," the IBM brief asserted.

"The rule that Calcomp seeks amounts to a rule that prohibits an established or dominant firm from making any reduction from prices once set," IBM continued.

Furthermore, "IBM's profitable price reductions could not support a finding that IBM attempted to monopolize any market," IBM stated.

In the section devoted to the thesis that Calcomp failed to prove IBM has monopoly power, IBM said that it has reduced, not raised prices, that competitors are "strong and growing," that new competitors have entered and succeeded and that there is direct proof of competition.

"The fact that defendant's market share is declining in the face of continued entry and growth of its competitors is inconsistent with the possession of monopoly power," the brief pointed out.

. . . But Others Support Calcomp: Price Cuts Don't Void Monopoly

SAN FRANCISCO — Like the three musketeers, three firms with antitrust suits against IBM share a binding interest in each other's welfare — in the courts at least.

Both Transamerica Computer Corp. (TCC) and Memorex Corp. have filed amicus curiae, or "friend of the court," briefs supporting California Computer Products, Inc.'s appeal to the Ninth Circuit which seeks to overturn the directed virdict issued by Judge Ray McNichols in the Calcomp vs. IBM antitrust case [CW, Sept. 5] The Justice Department also filed a similar brief.

The suits filed by TCC, Memorex and Calcomp were all consolidated for pretrial discovery. TCC and Memorex therefore view with concern the fate of the antitrust trial of fellow musketeer Calcomp.

In their briefs, they expressed fears that if the logic espoused by the granting of the directed verdict prevails, Section 2 of the Sherman Antitrust Act will have been seriously eroded.

Although both indicated they intend to prove in court that IBM priced some of its products below cost, they pointed out that a large firm does not have to price its products below cost in order to be considered a monopoly engaging in anticompetitive practices.

Both briefs labeled as diversionary the IBM concept that to be anticompetitive one must price its products below cost. They contended IBM engaged in price balancing, lowering prices on some products while raising them on others, so the net result was that consumers did not receive any benefits.

TCC said these reductions were "in no sense procompetitive. It is not and should not be the law that a monopolist can exclude competition by pricing actions and then be excused simply by asserting that it believed its products would return reasonable" profits, the TCC brief argued.

In fact, IBM's defensive tactic of pointing out that it did not price any products below cost is "dangerous where, as here, the products at issue are leased. The evidence consists of projections and the monopolist is the source of those projections," TCC continued.

"IBM's position . . . that a monopolist can lawfully do what any other firm could do has been rejected by the law for over 30 years," TCC stated.

"Furthermore, only a monopolist could do what IBM has done and only a monopolist with the purpose to maintain its monopoly by means other than innate superiority would do it," TCC said.

"It has never been the law under Section 2 that a monopolist can undertake anticompetitive conduct with impunity so long as its products show a profit by some economic standard," TCC said.

"Such a test must never be the law if Section 2 is to be anything more than an exhortation, especially in a lease industry in which a monopolist can, with facility, represent products as profitable simply by projecting them to be profitable," the brief added.

The Memorex brief focused on the criteria under Section 2 for judging the legality of price cuts by a firm possessing monopoly power.

"A failure by this court to reverse the directed verdict may be construed as placing price cuts by a dominant firm beyond the scrutiny of the trier of fact," Memorex said.

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Services Mart to Rise Annual 18%, Adapso Told

By Molly Upton
CW Staff

NEW YORK — Led by a forecasted annual growth rate of over 22% in the software sector, computer services industry revenues are expected to grow at 18% compounded annually through 1981, according to a study prepared for the Association of Data Processing Organizaitons (Adapso) by the International Data Corp. (IDC).

Revenues in 1981 should total $12 billion compared with $5.3 billion in 1976, the report said.

The 18% projection exceeds the 13% forecast for the computer manufacturing industry during the same period.

During 1976, the services industry obtained a 17% increase in revenues over those of 1975, whereas in 1976 the rate was 16%, the report noted.

Sales of software packages should have continued strong growth, with a 30% increase in 1977 followed by 30%, 28%, 25% and 22% in the following years, IDC indicated.

In 1976, software packages accounted for 10% of the industry's revenues, of $550 million. This figure should grow to 15% by 1981, to about $1.85 billion, according to the report.

Processing services will retain the lion's share of the industry's revenues, ranging from 68% in 1976 to 67% in 1981 and experiencing annual growth no lower than 16%, the report stated.

The staff support services sector will decline from 13% of the industry revenues in 1976 to 9% in 1981, while facilities management will maintain a constant 9% of the industry revenues, IDC said.

In 1976, companies with revenues of over $10 million, which represented only 2.5% of the total number of services firms, accounted for over 51% of the revenues of the entire industry, or $3.79 billion, IDC indicated.

However, 2,280 firms with revenues under $2 million divided up $1.4 billion or 25% of the revenues.

Medium-size firms between $2 million and $10 million accounted for 23%, or $1.2 billion in revenues, the study said.

Gross Profits

Looking at gross profits as a percentage of revenues, IDC found medium-size software firms led with 15%, followed by large processing firms with 13% and small processing firms with 12%.

Processing firms derived 53% of their revenues from specialty products, while software support types of firms obtained 54% of their revenues from packaged software, of which 31% came from system packages and 23% from application packages. Processing firms are those which receive the majority of their revenues from processing services; the software staff support and multiproduct companies constitute the software category for this particular breakdown.

The study, based on responses from 107 firms, cited as factors influencing the strong growth:

- The economic recovery.
- Vendor's recognition of the potential market for minicomputer-related products.
- New products, both those which improve the price/performance ratios and those which expand the potential customer base.

CI Notes

Proceedings Ending In Viatron Bankruptcy

BOSTON — Bankruptcy proceedings are nearly complete for Viatron Computer Systems Corp., which went out of business three years ago.

The plan pursuant to Chapter 10 has been approved by the U.S. District Court, District of Massachusetts, here. A hearing on the confirmation on the plan will be held Oct. 27 at the court.

Since cash is sparse, no creditors or stockholders can be paid and none are affected by the plan, the court indicated.

Design 100 Hires Sorbus To Support Gen-Com Units

ESCONDIDO, Calif. — Design 100 Corp. said it has retained Sorbus, Inc. to help it support the installed base of 2,500 printer terminals originally sold by Gen-Com Systems, Inc.

Design 100 jointly developed Gen-Com's Uniterm communications terminal and manufactured about 1,000 of the units, the firm said.

Following Gen-Com Systems' entrance into bankruptcy proceedings, Design 100 signed the support agreement with Sorbus, which also enables Sorbus to negotiate with Design 100 distributors to maintain its Cleantype family of products, the firm said.

Design 100 said it views the base as potential upgrades to its Cleantype line.

Graham, Carlisle Ink Agreement to Merge

FORT WORTH, Texas — Graham Magnetics, Inc. has signed a preliminary agreement to merge into a wholly owned subsidiary of Carlisle Corp., a diversified manufacturer.

Under the agreement, subject to approval by Graham shareholders and compliance with certain conditions, Graham holders would receive $18 in cash for each Graham share.

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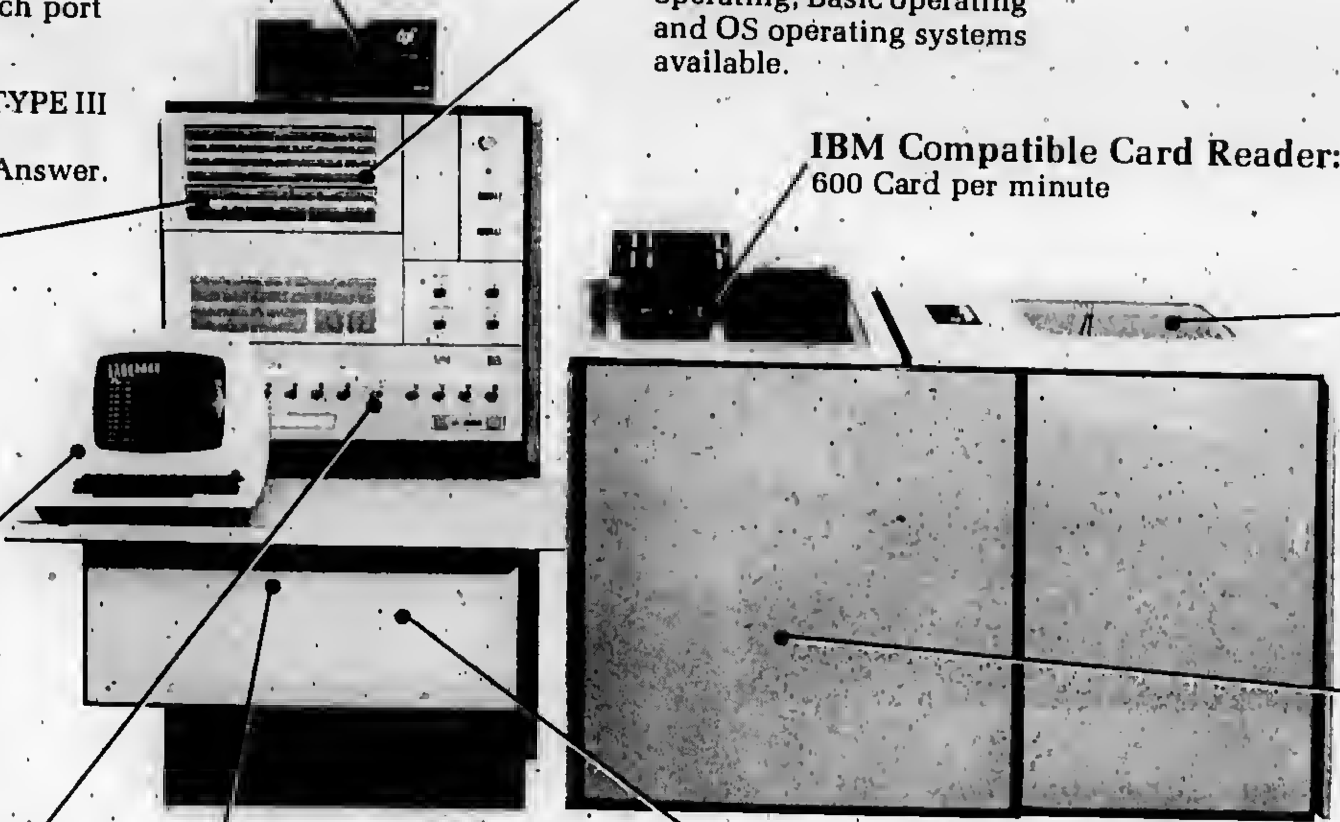

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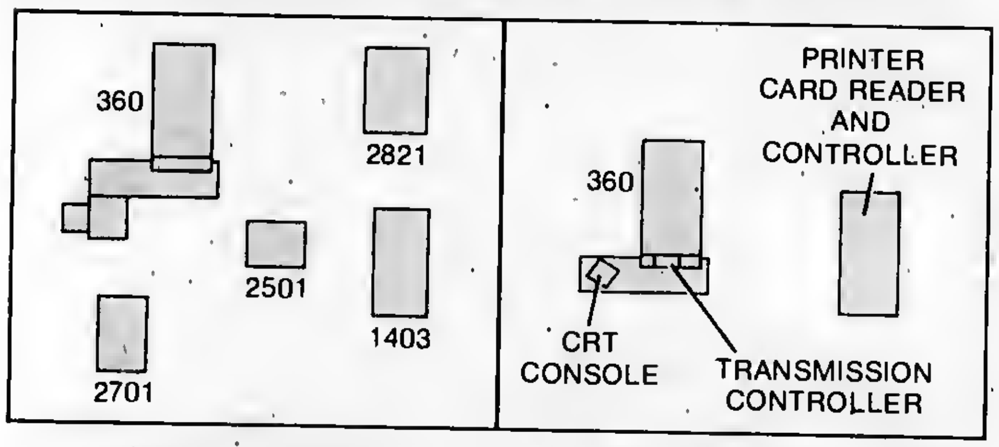

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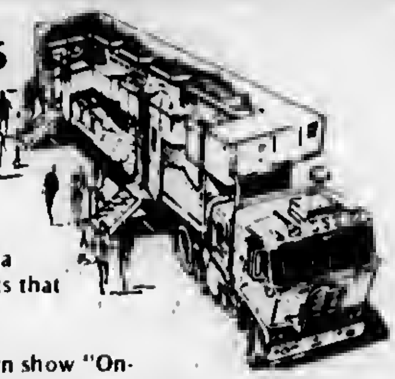

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DG Seeking Trade Relief From Brazil's Import Bars

WESTBORO, Mass. — Data General Corp. has asked the President's special representative for trade negotiations to attempt to mitigate the quandary of U.S. minicomputer makers concerning Brazilian importation restrictions.

Currently the Brazilian government imposes a quota on the number of minis that can be imported and also levies a sizeable tariff on them.

It is seeking to foster its own native industry and requires those U.S. minicomputer firms seeking a manufacturing license to agree to the sale of hardware and software technology, a DG spokesman said.

DG suggested four options for the negotiator to consider.

According to a briefing paper submitted by DG to a government representative last May, the U.S. could consider a "bilateral request that Brazil eliminate tariff and non-tarrif barriers on U.S. minicomputers in exchange for shelving retaliatory U.S. barriers on Brazilian imports into the U.S."

Another tactic would be to initiate a bilateral request that "Brazil eliminate technology transfer requirements for granting manufacturing license to U.S. firms in exchange for granting U.S. approval for such manufactruing licenses."

Other techniques would be to establish "U.S. regulations prohibiting ownership transfer of minicomputer technology (hardware and software) to any wholly owned foreign firm, but permitting manufacturing licenses."

The fourth option would be to establish "U.S. regulations prohibiting foreign government agreements with U.S. firms providing them exclusive exemption from import quotas or licenses," according to the DG memo.

Preference for Export

The memo outlined the firm's preference for expanding international business through export of its U.S. designed and manufactured products.

"There are no basic cost advantages to foreign manufacture, either direct or through license, of this type of high-technology product," DG said.

In fact, "there are likely to be less advantages in the future to foreign manufacture [because of] the greater foreign inflation rates and further miniaturization of the basic product," the minimaker stated.

DG has granted manufacturing licenses only as an "undesirable alternative to export in order to meet foreign government requirements for entry into foreign markets," the memo continued.

Because of rapid technology changes, manufacturing licenses restrict access to future products and assure "eventual obsolescence of the licensee's processes."

However, the Brazilian government wants not only a manufacturing license but also the transfer of technology. DG has received similar requests from less developed countries and the Soviet Union.

The transfer of minicomputer technology is a "cheap and effective method" for foreign nations to deal with rising foreign national inflation rates and enlarging trade deficits, DG observed.

Since the export of U.S. minicomputers is rarely restricted on technological grounds, minis are well suited to "such exploitation," the DG memo observed.

Automation Exhibition Slated for Singapore

SINGAPORE — An exhibition and seminar on Automated Business and Banking Equipment will be held March 27-31 at the U.S. International Marketing Center here.

For more information contact George I. Middleton at U.S. Department of Commerce, DIBA/BIC/OIM, Room 4126, Washington, D.C. 20230.

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IBM, India Negotiating Firm's Future There

ARMONK, N.Y. – IBM and the Indian government have not yet reached agreement on a plan that will enable IBM India to remain in the country.

The nub of the problem appears to be the government's Foreign Exchange Regulation Act (Fera) that allows 100% foreign-owned firms to remain in the country only if their sole operation is manufacturing devoted exclusively to export.

A Fera representative told IBM India it could continue to do business in India only if it were to dilute its equity in marketing and service [maintenance] business to 40%, an IBM spokesman said.

IBM does not wish to dilute ownership of its manufacturing plant in Bombay, nor does it wish its operations restricted to exports, a spokesman stated. It locates plants only in countries where it markets its products, he continued.

The firm has received verbal indication that Fera has rejected its four-pronged proposal, which included spinning off and diluting ownership of its service bureau operations, he added.

Under the April 1976 proposal, IBM would agree to:

- Reorganize IBM India's computer service bureau to provide 60% Indian ownership.
- Grant nonexclusive licenses to IBM's patents.
- Establish joint projects to help further extend technological developments in India such as a jointly run scientific center with an IBM System 370 and an IBM-developed electronic testing laboratory for government use.
- Manufacture in India exclusively for export with an annual export goal of $10 million. The export-only manufacturing plant in Bombay would be part of a fully owned company which would continue IBM's traditional marketing and service operations in India, IBM said.

As part of its "traditional marketing and service operations," IBM would want to be able to import and sell 370s within the country, the spokesman said.

Under the proposal, IBM's Bombay plant, which now produces unit record equipment and parts for other plants and thus serves the Indian market, would be geared exclusively to the export market, an IBM spokesman said.

IBM is awaiting "receipt of the official letter of notification of the government's decision and we are still hopeful the government will accept our proposal and not force us to leave India," the spokesman said.

IBM India employs 800 Indians, down from 1,200, and has been in the country 25 years, the spokesman continued:

Since the opening of the Bombay plant in 1964, exports have created a favorable balance of trade for IBM India, the spokesman said.

Also, as recently as two years ago, the exports from IBM's plant accounted for about 50% of India's electronic exports, he added.

As a result of import and licensing restrictions, an inability to obtain government approval of customer orders for System 370 and its uncertainty about the future, last year IBM offered, and 300 employees accepted, financial assistance in pursuing other careers, the spokesman said.

Acquisitions

Automatic Data Processing, Inc. has acquired **Association Service Corp.** and has also contracted to acquire **Eastern Data Processing, Inc.**

Computer Specialists Corp.'s Pepco Division has purchased the inventory and product rights to the **Millifile Microfiche Camera** and accessories from **Eurotec International.**

Lear Siegler, Inc. has acquired the assets of **Hydra Corp.**, a matrix printer firm.

On-Line Systems, Inc. has agreed in principle to acquire the stock of **Atkins Computing Services Ltd.**, a time-sharing and batch bureau headquartered in England, and a related small time-sharing company headquartered in the Hague.

NLT Computer Services Corp. has signed an agreement to purchase the Washington, D.C.; Memphis; Beloit, Wis.; Chicago and Minneapolis offices of **Analysis and Programming Corp.**

Mohawk Data Sciences has been holding preliminary discussions toward the acquisition of **Keuffel & Esser Co.**

Anacomp, Inc. has agreed in principal to acquire the outstanding common stock of **Computer Management, Inc.**

Carlisle Corp. has agreed in principle to acquire **Graham Magnetics, Inc.** All of the outstanding common stock of Graham Magnetics will be sold for a net cash purchase price of $18 a share.

Trans Union Corp. has acquired **Rochester Instrument Systems (RIS).** Trans Union will exchange .45 share of its common stock for each share of RIS common stock.

The **Microfax Division of Universal Information Systems, Inc.** has acquired the assets of **McDonald Micradata Services, Inc.**

EG&G, Inc. has acquired **Quality Measurement Systems, Inc.** through an exchange of common stock.

Rapidata, Inc. has acquired the time-sharing services accounts of the **Acts Computing Division of Lear Siegler, Inc.**

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Pertec to Set Profit Records: Poppa

LOS ANGELES — Pertec Computer Corp. will set records in revenues and profits this year and a sales and earnings growth rate of more than 20% annually is an achievable goal, the firm's chairman predicted recently.

Ryal R. Poppa, who also serves as president and chief executive officer, told stockholders at the annual meeting that Pertec is in a good position to take advantage of the expected growth in both the microcomputer and distributed processing areas.

The rising cost of everything but computing power is going to make computer use progressively more attractive in the late 1970s and early 1980s, Poppa noted, predicting that the small business computer user of the future will be part of a market that didn't exist three years ago, but that will account for $100 million in revenues by the end of this decade.

"While some people assume that the computer market is mature because it has been around for 20 years-plus, nothing could be further from the truth," Poppa told shareholders.

"There are millions of small businesses, homes, institutions and departments within large companies that can now afford computers because the cost is coming down so fast," he added.

Pertec, he indicated, is well placed to serve these markets because it sells peripherals to mini manufacturers, markets key-to-disk systems to end users through its CMC division, and sells directly to hobbyists and small businesses through its Altair and ICOM lines of microprocessors and micro peripherals.

Poppa noted that in fiscal 1977 Pertec had revenues of $94.5 million, while in the previous year — which was shortened to nine months because of the CMC acquisition the revenues had been only $36.7 million.

ADP Earnings Up 24%

CLIFTON, N.J. — Automatic Data Processing, Inc.'s earnings in the fourth fiscal quarter ended June 30 rose about 24%, to $6.7 million or 45 cents a share, from $5.4 million or 37 cents a share a year ago.

Revenues rose some 17% to $64.6 million from $55.3 million in the year-ago period.

Earnings for the full fiscal year also climbed 24% to $23.3 million or $1.58 a share compared with $18.7 million or $1.28 a share in 1976.

Revenues rose 23% to $245 million from $199.2 million in fiscal 1976.

ADP's results are about in line with President Frank R. Lautenberg's forecast last February that fiscal 1977's earnings would rise about 25% on a somewhat lesser increase in revenue.

During fiscal 1977, ADP acquired CPI Group, Inc., First Data Corp. and several smaller service operations at prices totaling $2.3 million in cash and 570,000 shares of stock valued at about $16 million. These concerns contributed about $15 million to the firm's 1977 revenue, according to Lautenberg.

Foreign operations have grown substantially since ADP first moved outside the U.S. about two years ago, he added. Foreign operations in Europe, Canada and Brazil had operating profits, before corporate expenses and taxes, of $4.1 million on revenue of $20.1 million in fiscal 1977.

Incoterm Reports Increase In Revenues and Earnings

WELLESLEY HILLS, Mass. — Revenues and earnings both increased at Incoterm Corp. here during the second quarter and first half of this year.

The firm reported revenues of $11.5 million and earnings of $628,000 (31 cents per share) during the second quarter ended Aug. 27. In 1976, the firm reported income of $8.9 million and a net of $556,000 (28 cents per share) in the comparable quarter.

At the same time, the six-month figures totaled $23 million in revenues and $1.2 million in earnings (62 cents per share) compared with last year's $17.1 million and $912,000 (.46 per share).

Backlog at the end of the period amounted to $24.5 million, down from the company record of $27.5 million set at the end of the second quarter of 1976.

Adds Up

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. here reported records for both earnings and revenues during the third quarter ended Aug. 31 this year.

And the record quarter helped boost the nine-months results about 50% over those reported for the same period in 1976.

In the quarter, revenues reached $9.4 million compared with the year-ago $6.1 million, while earnings went to $1.6 million from $1.2 million. Since the stock was increased dramatically during the same period, earnings per share dropped from 33 cents in 1976 to 29 cents in 1977.

In the first three quarters of the year, revenues topped $22.6 million and earnings reached $5.1 million. This compares with the first nine months of 1976 when revenues were $16.5 million and earnings were $3.8 million. Again, however, the earnings per share dropped — from 86 cents in 1976 to 75 cents in 1977.

Nickels & Dimes

Data Terminal's common stock has been approved for listing on the American Stock Exchange under the ticker symbol "DTS."

$$$

National Computer Systems has declared a quarterly dividend of five cents a share payable Sept. 27 to holders of record Sept. 2.

$$$

Honeywell has increased its quarterly dividend to 47-1/2 cents a share, up from 40 cents a share. The increased dividend is payable Sept. 12 to holders of record Aug. 26.

$$$

Wyly has revised its recapitalization plan in what it called the "last and best offer the company will make on a voluntary basis." Under the new plan, Wyly will declare a reverse one-for-four split of its 8.3 million common shares instead of the one-for-two previously proposed.

$$$

United Telecommunications has declared a quarterly dividend of 32 cents per common share and 37-1/2 cents per preferred share payable Sept. 30 to holders of record Aug. 25.

$$$

Computer Sciences has postponed its annual meeting of shareholders until Oct. 11. This second postponement will allow time to resolve legal issues in the agreement between CSC and the Jones Foundation.

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International News

Fujitsu Introduces Family of On-Line Networks

Fujitsu Ltd. has announced the Fujitsu Network Architecture (FNA), a logically structured and streamlined family of on-line computer networks. So far, Fujitsu has developed a number of on-line network systems, recognizing that standardization of computer-system components is essential to computer applications.

In recent years, computer usage has progressed from batch-processing to single-host networks and multiple-host networks.

The FNA expands the application and utilization of computer systems worldwide and meets demands for improved cost-performance and efficient, reliable service so important to the current fiercely competitive market, according to the firm.

Each network in the FNA is made up of a number of components — host computers, communications processors, subhosts, cluster controllers and compatible terminals — which are effectively combined under a single-line discipline.

Basically, data communication functions within the various components are separated from DP functions, enabling the system to take on many applications on the same line.

Protocols and operational sequences, however, are clearly defined for transmitting information units through the communication system.

The FNA lessens the work-load and demand on the host computer and minimizes the cost of extra lines and duplicated programming, Fujitsu said. The capability of existing systems is also expanded without much extra expense. Compatible computer networks such as the 230-5 Series, the 230-8 Series and the "M" Series can be hooked into the FNA through high-level data link control procedures, and other transmission control procedures are also available.

The FNA also provides access to leased lines, telephone switching systems, the Dendenkosha Data Exchange, the data highway (high-speed lines installed in plants) and optical communications, the firm said.

Based on recommended guidelines of the International Organization for Standardization (ISO) and the Comite Consultatif International Telegraphique et Telephonique (CCITT), the FNA is compatible with all networks in or out of Japan. Furthermore, it incorporates the "M" Series Network Architecture (MSNA) and is scheduled to align with the Data Communication Network Architecture (DCNA), Fujitsu stated.

Contracts

Computer Sciences Corp. has been awarded a $3.2 million support contract by the Energy Research and Development Administration to manage and operate computer and communications facilities at the agency's Nevada Operations Office.

Wango, Inc. has received a $2 million OEM contract from Cobra, S.A., Computadores e Sistemos Brasileiros for tape, disk and formatter products.

Tri-Data has received a $1.25 million OEM contract from Teradyne, Inc. to supply Cartri File Model H819, H809 and H820 magnetic tape systems for Teradyne's automatic test system.

Honeywell Information Systems has received a $1.6 million contract from Transportation Computer Systems, Inc. for a major upgrade of its midwestern DP network.

Logicon, Inc. has received two contracts totaling $1.1 million from the Air Force systems command to support the IBM Federal Systems Division in developing an adaptable surface interface terminal.

Computer Sciences Corp. has received a contract from Western Electric for nationwide time-sharing services.

General Instrument Corp.'s Rotating Memory Products has received a contract from National Micronetics, Inc. to support disk memory products.

System Maintenance and Services Ltd. (SMS) has received a contract from Digital Scientific Corp. to provide maintenance support for Digital Scientific customer installations throughout Europe.

University Computing Co. has licensed the use of its UCC/CIF (Central Information File) to the Federal Reserve Bank of San Francisco, Calif.

Microwave Semiconductor Corp. has been awarded an 18-month fixed-price contract by the International Telecommunications Satellite Organization for the development of a 4 GHz power transistor.

The Air Force Computer Acquisition Office has extended the existing contract with Burroughs Corp. for the B6700 system.

Canada Systems Group has been awarded a three-year DP services contract by Labatt Breweries of Canada Limited.

Datacrown Limited has received a three-year DP services contract from Agriculture Canada.

Digital Communications Corp. has been awarded a contract by Telenet Communications Corp. for 75 CP-9000 communications processors.

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Future Offices

HOLLYWOOD, Fla. — Four days of intense focus on the impact of computers, networks and other types of office automation on the working environment have been scheduled for Nov. 6-10 at the Diplomat Hotel here.

Sponsored by International Data Corp. (IDC), "Information Networks/Tomorrows Office" will cover topics ranging from word processing systems and electronic mail to voice/-data nets.

Speakers will include Howard Anderson, president of The Yankee Group; and Jack Fox, vice-president of Satellite Business Systrems.

Registration for the conference is $750. Details are available from IDC at 214 Third Ave., Waltham, Mass. 02154.

Boole & Babbage Ends First Decade

SUNNYVALE, Calif. — Boole & Babbage, Inc. (B&B) last month observed its 10th anniversary.

During the decade, the creator of performance evaluation software has made the transition from being dependent on two products, the Problem Program Evaluator and the Configuration Usage Evaluator, to having a range of 12 products in the areas of performance, computer cost accounting and operations management, with most recent emphasis on real-time performance analysis.

B&B is currently contemplating products that not only diagnose performance problems, but also automatically make the changes necessary to improve the system's performance, according to Bruce T. Coleman, president.

B&B now has a network of sales and service offices in 15 U.S. cities and 20 abroad, he said.

Tracing the evolution of B&B's products, Coleman said that as hardware and software technology increased in complexity, early evaluation and optimization techniques, which relied on direct observation of the physical computer environment, became increasingly difficult to use.

"By 1974, we had determined that B&B must move to automate the performance management process as much as possible, he said. Three changes in the industry made this apparent:

- The masking of how efficiently an individual job utilizes a system's resources because of multiprocessing.
- The shift from basic machine languages to those more closely resembling the English language.
- The arm's-length relationship between programmers and systems created by the use of terminals.

Recognizing these trends, B&B has moved ahead in computer performance, accounting and operations management, Coleman said. Its most recent response to industry needs is a line of Computer Management Facility (CMF) products which provide real-time performance analysis and management of the computer environment.

Few DP organizations ever consider developing their own performance monitors because they recognize the high costs of development, time involved and shortage of programming personnel, Coleman said.

Executive Corner

- Robert D. Baskerville has been named vice-president of the Infonet Division of Computer Sciences Europe, a subsidiary of Computer Sciences Corp.
- Howard G. Ulep has joined Computer Performance Associates, Inc. as senior vice-president.
- Eliott D. James has been promoted to the newly created post of vice-president and general manager of the Dallas operation of Harris Corp.'s Data Communications Division.
- Arnold M. Bloom has been appointed director of marketing at Bowe Systems.
- Dr. Theodore W. Stein has been elected chairman and Michael Ohannesian has been named president of Halcon Computer Technologies, Inc.
- David T. Morgenthaler Jr. and Edward F. Thompson have become vice-president for business planning and treasurer, respectively, of Amdahl Corp.
- C. Peter McColough has been elected president and chief operating officer of Xerox Corp.
- Lawrence Seligman has been appointed director of small business systems and development and Francis A. Rowe has been named director of systems marketing programs for Data General Corp.
- Charles A. Dickinson has been named vice-president for manufacturing at Memorex Corp.
- Elliott Wassarman has been named Qume Corp.'s vice-president for marketing.
- Joe Grills has been elected to the newly created position of vice-president, finance, of the IBM World Trade Americas/Far East Corp.
- Dr. Herman Levin has been appointed vice-president for development at Tri-Data Corp.
- Gerald S. Newton has become vice-president for corporate manufacturing at Information Terminals Corp.
- Paul C. LaVoie has been promoted to senior vice-president of Sycor, Inc., which also has named John S. Cain and Paul T. Cochlan as vice-presidents.

"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we provide peripherals and supplies to avoid further complications.

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In Communications, Storage

Ampex Eyes Greater Growth, New Markets

REDWOOD CITY, Calif. – Ampex Corp. is in a strong position to play a major role in the two major growth areas of the future – visual communications and the storage and retrieval of information, Richard J. Elkus, chairman of the board, told shareowners recently.

"Ampex has established major growth positions in both of these areas and we have every reason to believe that our growth will continue," Elkus said, indicating that sound growth, not volume , is the corporation's aim.

Arthur H. Hausman, president, pointed out that Ampex is able to look to the future because of strong profitability in recent years that has been accompanied by a large reduction in the company's debt.

For fiscal 1977, the company reported a 77% increase in net earnings on a $29 million increase in sales and revenues to $287.4 million. That trend has continued into fiscal 1978: First quarter net earnings totalled $4.5 million, up sharply from the $1.8 million reported in the same period of 1977.

Hausman also pointed out that Ampex recently signed two new unsecured loan agreements. The agreements provide $30 million in long-term funds and $25 million in a prime rate-priced revolving credit agreement, which is not being used at present.

"We are now in the position to move beyond today's markets and into areas where what we have learned from over 30 years of technical achievement can be applied to the extension of present business and the development of new markets," he stated.

He noted that Ampex's recently formed magnetic tape joint venture in Mexico, Aurex, is successfully under way and that similar opportunities in other parts of the world are currently being investigated.

He pointed out that international sales are now a major strength of the corporation and added "Developing countries throughout the world present especially attractive marketing opportunities, as their needs for high-technology goods and services provided by Ampex grow more immediate."

Hausman reviewed Ampex's growth opportunities in the memory market, saying "we believe that the unique place for core memory products in the hierarchy of digital memory systems will continue in the future, but we also recognize the outstanding opportunities for complementary technologies in the marketplace: semiconductors, charge-coupled devices and magnetic bubble memory systems.

"Ampex has technical competence in these technologies and, looking toward the future, one should expect to see our memory products division providing families of products involving a number of these diverse technologies."

Orders & Installations

The Minnesota Educational Computing Consortium has ordered a Control Data Corp. Cyber 73 system to provide instructional computing for all levels of education in Minnesota.

Optico Industries, Inc., a manufacturer and retailer of eyeglasses and contact lenses, has ordered a Univac 90/30 system.

The Elyria, Ohio *Chronicle-Telegram* has ordered a T-410 publishing system from Tal-Star Computer Systems, Inc. for its news, classified/display and business DP.

McDonnell Douglas Corp. has installed the first two models of the Navy's standard airborne computer, the AN/AYK-14 from Control Data Corp. for the F-18 program.

The Oregon Bank has ordered $1.2 million worth of on-line BAS 2000 equipment from SCI Systems, Inc.

Worrell Newspapers, Inc. headquartered in Charlottesville, Va., has ordered a Honeywell Level 62 system.

Boise Cascade Corp. has ordered two Measurex Corp. energy control systems for its pulp and paper mill in International Falls, Minn.

The Chippewa Valley School District in Michigan has ordered a PDP-1134 system from Digital Equipment Corp. for its new vocational education center.

Crocker Bank of San Francisco has contracted to lease electronic proof and encoding equipment worth over $3 million from NCR Corp.

State Farm Mutual Automobile Insurance Co. has ordered computer output microfilm systems from Datagraphics, Inc., a General Dynamics subsidiary.

Stop & Shop Companies, Inc. has ordered a check-cashing and verification system from Value Exchange Corp.

Western Forge Corp., a manufacturer of hand tools for Sears, has ordered a Honeywell Level 64 system.

May Department Stores of St. Louis has ordered a Deposit Reporting System from National Data Corp.

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PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

10	Manufacturer of Computer or DP Hardware/Peripherals
20	Manufacturer (other)
30	DP Service Bureau/Software/Planning/Consulting
40	Public Utility/Communication Systems/Transportation
50	Wholesale/Retail Trade
60	Finance/Insurance/Real Estate
70	Mining/Construction/Petroleum/Refining
75	Business Service (except DP)
80	Education/Medicine/Law
85	Government-Federal/State/Local
90	Printing/Publishing/Other Communication Service
95	Other: ____________

TITLE/OCCUPATION/FUNCTION

11	President/Owner/Partner/General Manager
12	VP/Assistant VP
13	Treasurer/Controller/Finance Officer
21	Director/Manager of Operation/Planning/ Administrative Service
22	Director/Manager/Supervisor DP
23	Systems Manager/Systems Analyst
31	Manager/Supervisor Programming
32	Programmer/Methods Analyst
41	Application Engineer
42	Other Engineering
51	Mfg. Sales Representative
52	Other Sales/Marketing
60	Consultant
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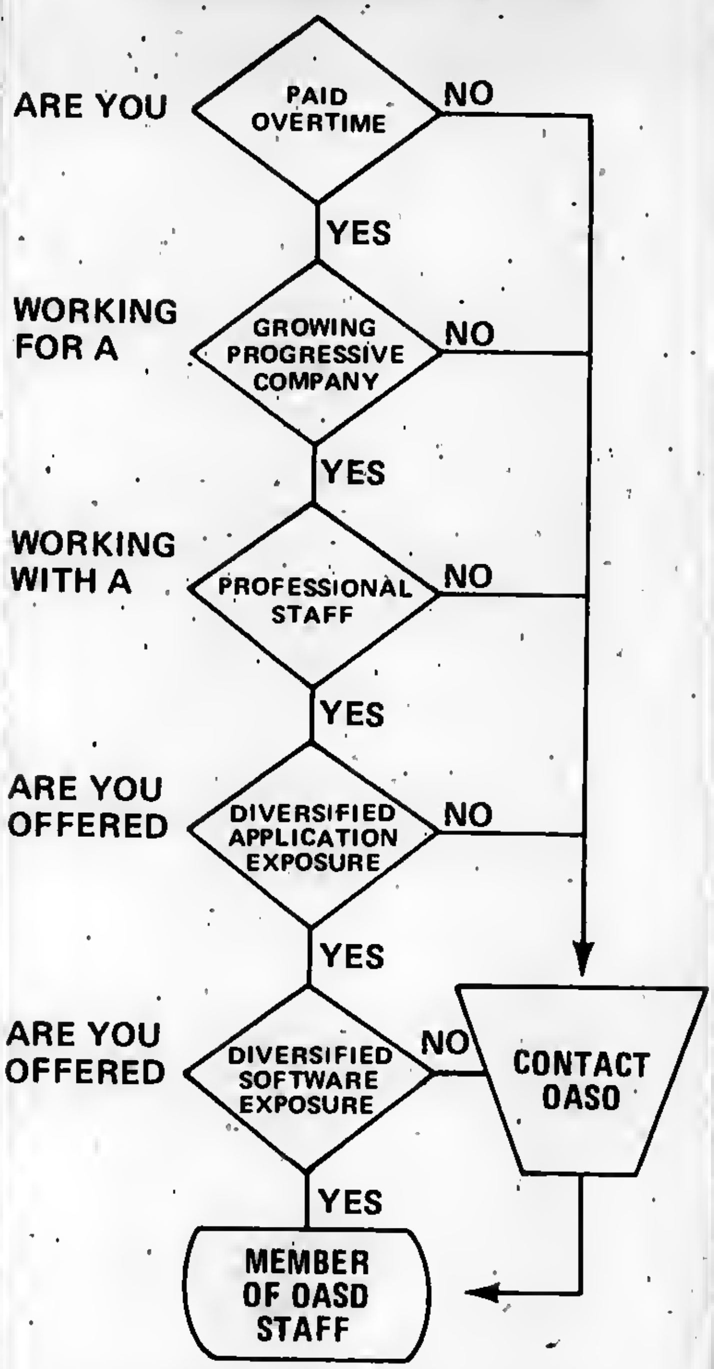

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- Positions involve the design and development of magnetic recording devices, including electromechanical control, instrumentation and testing.
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- Positions involve the evaluation of electrical components. Responsibilities include the development of circuits and programs required for the analysis of LSI modules and discrete circuits, characterizing and writing the specification to release LSI modules, and the development of magnetic head and media standards and specifications.
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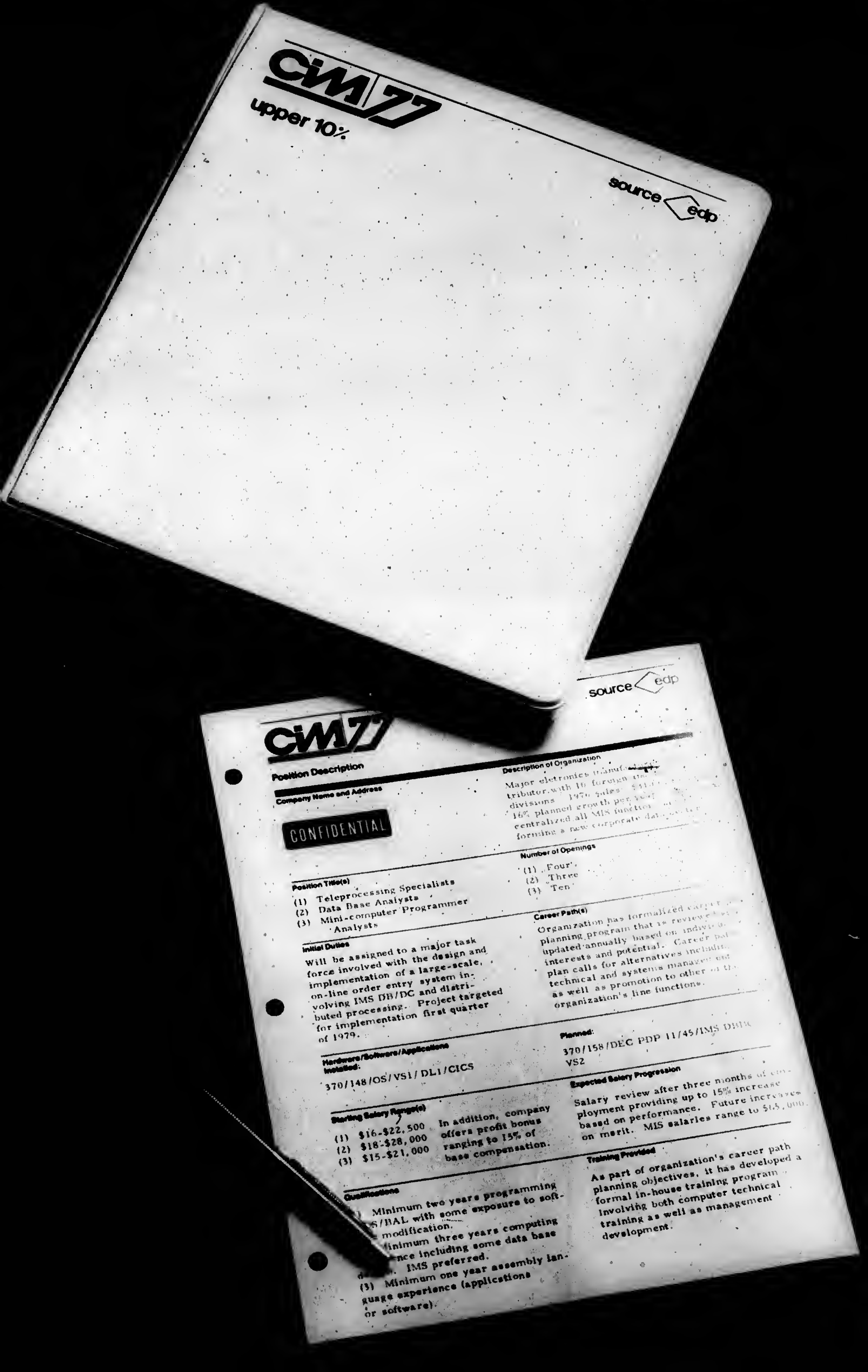

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CIM 77

Position Description

Company Name and Address

CONFIDENTIAL

Position Title(s)

(1) Teleprocessing Specialists
(2) Data Base Analysts
(3) Mini-computer Programmer Analysts

Initial Duties

Will be assigned to a major task force involved with the design and implementation of a large-scale, on-line order entry system involving IMS DB/DC and distributed processing. Project targeted for implementation first quarter of 1979.

Hardware/Software/Applications Installed:

370/148/OS/VS1/DL1/CICS

Starting Salary Range(s)

(1)	$16-$22,500	In addition, company offers profit bonus ranging to 15% of base compensation.
(2)	$18-$28,000	
(3)	$15-$21,000	

Qualifications

[illegible] Minimum two years programming [illegible]S/BAL with some exposure to software modification.
[illegible] [illegible]inimum three years computing [illegible]nce including some data base d[illegible]. IMS preferred.
(3) Minimum one year assembly language experience (applications or software).

Description of Organization

Major eletronics manuf[illegible] tributor with 16 foreign [illegible] divisions. 1976 Sales: [illegible] 16% planned growth per year [illegible] centralized all MIS function [illegible] forming a new corporate data center.

Number of Openings

(1) Four
(2) Three
(3) Ten

Career Path(s)

Organization has formalized career planning program that is reviewed [illegible] updated annually based on individu[illegible] interests and potential. Career pat[illegible] plan calls for alternatives includin[illegible] technical and systems management [illegible] as well as promotion to other of the organization's line functions.

Planned:

370/158/DEC PDP 11/45/IMS DB/DC VS2

Expected Salary Progression

Salary review after three months of employment providing up to 15% increase. Future increases based on performance. MIS salaries range to $[illegible]5,000 on merit.

Training Provided

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If you're like many people in today's highly dynamic and often frustrating computer profession, you may have become confused as to whether you're currently in the best position to meet your career objectives. Each week and month, literally thousands of new position openings are advertised in major newspaper and computer trade media across the country. Head-hunters of all sorts are touting the benefits of their clients with greater fervor (and perhaps exaggeration) than ever before. The demand for computer professionals is so high that some organizations are offering substantial cash "bonuses" just to get you to work for them. If you're confused, it's no wonder. Anyone would be. Source Edp now offers you a new program that will clear the air. We call it CIM/77 which stands for Career Improvement Month — November 1977. CIM/77 is a unique program designed to give you the impartial information you need to evaluate today's complex maze of career options in the computer job market. It allows you to scrutinize in detail the opportunities currently existing within the organizations we feel to be in the upper 10% in the nation. And, you can gain this vital information in a matter of hours while maintaining complete confidence.

CIM/77 is one of the most unique career planning programs ever developed for computer professionals.

CIM/77 participating organizations.

Source Edp has made special arrangements with 527 organizations to participate in our special CIM/77 program. In our judgement, these firms represent the elite in terms of providing hardware/software sophistication, challenging job assignments, personal development programs, rapid advancement potential, favorable working environments and compensation (starting salaries range from $15-$35,000 plus, in some cases, additional bonuses or special performance awards). Those participating in CIM/77 have been drawn from every part of the country. They include computer users in all industries, computer services/consulting firms and computer mainframe and peripherals manufacturers. Their sizes vary from relatively small, rapidly growing firms to some of the nation's most well known and regarded organizations. The total gamut of job content for professionals in programming, systems and software is available with emphasis on opportunities in advanced data base, data communications, distributed processing and new information systems development projects. Many offer formal training programs in both technical and management development. In total, over two thousand positions are available within CIM/77 participants — and you can confidentially evaluate each and every one.

One call or visit to Source Edp gives you inside information on the nation's top 10% and where you might fit in.

Here's how CIM/77 works.

CIM/77 company participants have worked closely with Source Edp to develop detailed job descriptions covering all of their planned openings for November, 1977. Each description reviews initial assignments and qualifications desired, indicates your likely career path (or in many instances multiple career paths), how long it might be expected to reach your goals, the kinds of assistance in the form of training and exposure provided, a complete synopsis of all planned hardware, software and applications and compensation levels at each step along the way. These descriptions involving all 527 CIM/77 participants are available for your perusal at each of Source Edp's 34 branch offices in North America. If you qualify as outlined below, you may review them at your convenience between now and November 30, 1977. (Even if you don't reside in a Source Edp based city, we'll be happy to provide you with this information by telephone). By participating in CIM/77 you'll be able to learn what the computer job market is really like and compare your current position with thousands of others on a local and national basis. And, if you find unique situations that better suit your career objectives, Source Edp is in a position to make discreet contact and follow-up for you. Of course, there is no charge to you since our clients assume all of our fees and other expenses.

Who should participate in CIM/77?

CIM/77 has been specifically designed for computer professionals having at least one to seven years of experience in programming, software, systems development and/or marketing support ranging upward in responsibility to project management. More importantly, the CIM/77 program will have greatest benefit to those professionals who are truly concerned with maximizing their career potential, desire the broadest possible exposure and seek the challenge of rapid advancement.

Your registration in CIM/77.

To take advantage of CIM/77, simply call the Source Edp office nearest you during normal working hours or use our special toll-free number, 1-800/821-2270, extension 505, which will be open twenty-four hours a day, seven days a week through the end of November. (Missouri residents please call 1-800/892-7655). One of our professional staff (each of whom has had extensive computing experience prior to joining the firm) will find out something of your background and career interests and then make a specific appointment for you to review the CIM/77 job description file at your private convenience. (Please note that evening and Saturday appointments are welcome.)

In all, CIM/77 allows you to review over 2,000 specific new position openings — in complete confidence.

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If unable to call, write:
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(Please be sure to indicate home address, telephone and position title.)

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If you're looking for a career that will let you make the most of your talents, investigate these positions with Digital. Forward your resume, outlining salary history and requirements to Mary Ann Joyce, Digital Equipment Corporation, Dept. H1017 3807, 129 Parker Street, Maynard, Massachusetts 01754.

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- Operating Systems
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- Languages
  (COBOL, FORTRAN, BASIC, MACRO-10, MACRO-20)
- BLISS or comparable implementation languages

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Under the general supervision of the Manager for Systems Software, the Systems Programmer will perform supporting functions for the Cyber 74 NOS system. Successful applicant may also be involved in communications software and evaluation and implementation of graphics equipment and software. Bachelor's degree required. Salary commensurate with qualifications and experience. Please contact Charles D. Lyman, University Computing Center, University of Massachusetts, Amherst, MA 01003. An Affirmative Action/Equal Opportunity Employer.

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Continuous 100% quota performers in medium and/or large scale computer systems. Track runners with CDC, Univac, Honeywell, DEC or other medium to large scale manufacturers are welcome.

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For software development to develop operating systems or compilers. Experience in either area is necessary. Degree plus heavy operating systems or compiler experience.

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To support field sales in pre and post sales situations. Large mainframe plus COBOL and FORTRAN with operating systems experience. Data base management and time sharing are pluses.

MIS ANALYSTS

For networking, distributed processing and computer aided manufacturing operations. Will develop business applications systems for our Management Information Systems Group.

FIELD CUSTOMER ENGINEERS

Will support field installations and must have large or medium CPU and peripheral experience. CDC, Univac or other large mainframers are welcome.

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Several positions are now available for logic design, packaging or power related engineering. BSME, BSEE or electronic experience is required.

TECHNICAL WRITERS

Positions available for hardware technical writers with programming experience or software development technical writers with appropriate programming skills as well as writing capabilities.

QUALITY ASSURANCE ENGINEERS

For components reliability checkout and tests. Will evaluate systems and will input management in the areas of specs. Several slots available for experienced digital computer manufacturing QC personnel.

SENIOR CONTRACTS ADMINISTRATOR

To do direct commercial and GSA negotiations and administration. Degree plus experience in capital ticket negotiations or negotiations relative to digital computer systems.

PERSONNEL

Generalist with emphasis in one of three functional areas is preferred; wage and salary, organizational analysis and development, or recruitment. Degree plus 5 years' experience a minimum requirement.

If you are a data processing professional and feel that you would like to make a change with a fast growing Fortune 500 company such as Harris, we would appreciate your taking the time to complete and clip out the information requested below. This will be held in the strictest confidence.

NAME ____________________

ADDRESS ____________________

CITY __________ STATE __________ ZIP __________

___ Enclosed is my personal resume for your convenience.

Attn: W.D. Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

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To qualify, you must be experienced in large system support including SVS/MVS, HASP/JES2 and VM370 and have a BS or MS in Mathematics or Computer Science.

These openings are with New England's largest employer and in a major division of a corporation high on the Fortune 50 listing. Thus, you will find salary levels and benefits at very desirable levels.

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We seek highly motivated marketing professionals who are used to being on quota and exceeding it, capable of developing new accounts and maintaining executive relationships with current accounts. You will need a minimum of 3 years sales experience in display terminals, data processing electronics or word processing equipment, have a proven sales record and be self-motivated. This is a sales opportunity leading to future marketing management.

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Heavy systems design and implementation background required. Responsibility in many different product areas is possible. Based on experience and interest. Persons with a background in the following will be considered. IBM terminal hardware and software (3270, 3790); point-of-sale systems; Intel 8080; Zilog Z80 microprocessors; data entry systems; intelligent terminal systems.

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The successful candidate will have 15-20 years of commercial product design experience, preferably in computer related equipment. Must have recent experience in the design of foam, compression and injection molded plastic parts. Responsibilities will include original design and documentation and liaison with engineering, manufacturing and outside vendors.

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These positions require technical school or military electronics training combined with a minimum of one year as a Field Service Engineer preferably in mainframe mini-computers, display terminals or point-of-sale terminals. These positions are located in many areas of the continental United States. Please state area preference in your cover letter.

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You will be responsible for the comprehensive evaluation and analysis of company financial results, plans, forecasts and estimates plus coordinating the development and consolidation of same. In addition you will recommend operational and investment financial measures to management and implement approved programs while providing financial counsel and liaison to department heads as required. The person we seek will have 8 to 10 years experience in accounting and financial planning and analysis with a minimum of 3 years experience in management. An MBA with emphasis in finance and/or accounting and a computer industry background is desirable.

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Courier Terminal Systems
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- Systems
  - I/O Drivers
  - Diagnostics
  - Operating Systems
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Basic Qualifications

- 1-3 years experience in Assembly language with mini or microcomputers
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Terminal Systems Division
NCR Corporation
P.O. Box 607
Millsboro, DE 19966

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Opportunities exist in California, Virginia, New York, Kansas and Pennsylvania. How do you find out which career opportunities are available in your preferred geographic area? We make it easy. We've established two "clearing houses." Send your resume with salary history and indicating the geographical area of your preference to either of the following:

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The Academic Computing Center at the State University College at Brockport is seeking a Systems Prpgrammer to install and maintain the operating system, programming languages and applications programs for a PRIME 400 computer. The position also includes supervision of the Center's Micro-Computer Laboratory.

Candidates should have a minimum of a Bachelor's degree, at least two years experience as a systems programmer on a general purpose time-sharing computer, fluency in high level and assembler languages, experience in the assembly and programming of microcomputers, and be able to relate effectively to users in an academic environment.

Starting salary is $12,750 - $16,667 commensurate experience and qualifications. A letter of application and complete resume should be sent, by Oct. 31, 1977, to: **ACADEMIC COMPUTING CENTER**

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PROGRAMMER/ANALYST

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While preferred qualifications include a degree, our prime interest is capability as demonstrated by experience in large-scale computer systems programming/analysis. Exposure to time-sharing and remote job processing is desirable. Specific applications in computer aided design or material and production control are currently available.

If you are interested in a sophisticated, large-scale systems operation in a desirable East Coast location, send your resume with salary history in confidence to:

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is undertaking the development of a series of large scale, state-of-the-art information systems. A number of opportunities are being created for individuals who possess outstanding breadth, coupled with technical and managerial excellence. If you combine imagination, enthusiasm, professional training and experience and wish to express these in an environment where you can enjoy the freedom to excel, Federal Express offers the following opportunities in the Information Systems Division.

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Responsible for the implementation and operation of multiple computer centers in diverse locations. Multiple vendor environment. We prefer strong business background coupled with good personnel and communications skills. This position offers major participation in planning activities.

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Federal Express offers a challenging growth-oriented environment with excellent advancement opportunity for the true professional, comprehensive benefits program including airline travel, and competitive compensation structure. For consideration send confidential resume specifying position desired and salary history to:

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PROGRAMMER

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For immediate consideration, send resume with earnings record (indicating area of expertise) to: Mr. Denis Simon, F.J. Reynolds Industries, Inc., 401 S. Main St., Winston-Salem, N.C. 27102. *An Equal Opportunity Employer M/F*

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Our business is the procurement, distribution, and wholesaling of consumable food and related products. It's a business that we know and in which we excel . . . where our very ability to function is tied to data processing systems. Our Information Systems group functions as an integral part of our management team. They reflect the vitality, expertise, and professionalism of our entire organization. We have such an organization because we learned long ago that if we provided careers for our associates, they would provide the profitability and growth. At Fleming it is not only your career . . it's OURS.

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B.S. in Computer Science, Math, Physics, or Engineering and programming experience with higher order languages such as Fortran, Pascal or PL/I. Both scientific and real-time programmers are required.

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WANG's dynamic growth has created the need for an Applications Specialist who is well versed in any one of WANG's Human Resource Management Systems (payroll - personnel - pension). This individual should possess strong communications skills as this position requires constant contact with our clients. The main responsibilities include travelling to client sites for the purpose of training and consulting on the implementation of WANG software systems.

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Subsidiary of NCR Corporation

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programmers

Diagnostics Programmer

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This position requires 5 or more years in supporting IBM operating systems and program products. Recent experience in supervising others involved in the software support function is desirable. This key management position calls for strong technical leadership and the ability to communicate consistently with management. municate consistently with management.

Software Specialist

This position requires 2 or more years system programming experience involving OS/MVT or OS/VS internals. Knowledge of telecommunications software would be a plus. A history of achievement as a technical problem solver within a software support group is essential. A working knowledge of mini computer concepts would be beneficial.

Technical Analyst

This position requires 3 or more years of data processing experience with an emphasis in the areas of control of data, telecommunication administration and technical analysis. Good communication skills are desired.

If you are interested in taking a closer look at our installation and discussing these positions and future growth potential, we invite you to apply. Send resume including salary history in confidence to:

JAN HAHN
PERSONNEL DEPARTMENT

ZAYRE CORP.

Framingham, Mass. 01701
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This individual must possess the ability to perceive and conceptualize system requirements from business needs. This individual must have an extensive background in developing financial applications including cost, General Ledger, and Product Profitability systems. The selected candidate must possess excellent communication skills, be results oriented and a minimum of two years experience in managing MIS projects. Other requirements include a BS in Accounting or Business Administration, MBA desirable; a minimum of five years of progressive Data Processing experience including data base.

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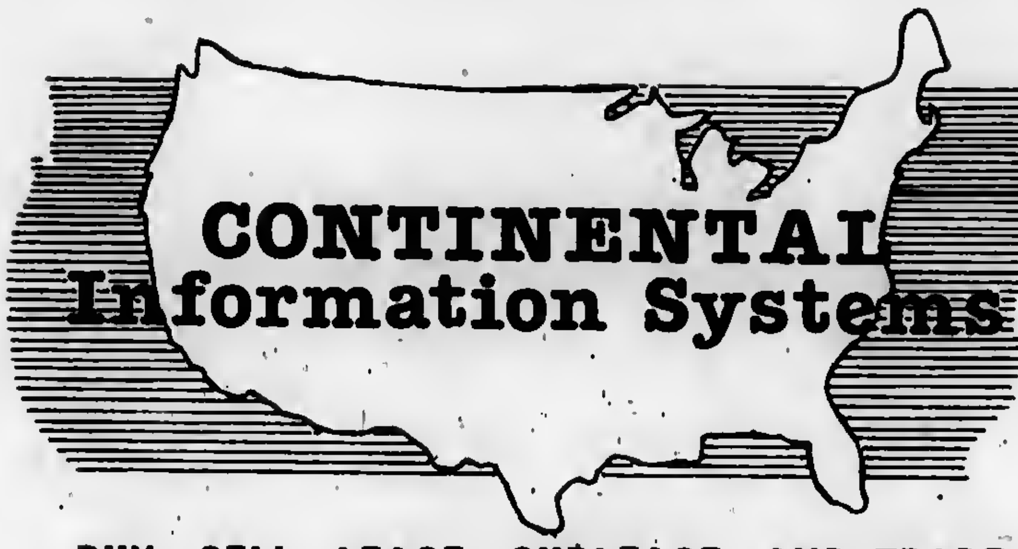

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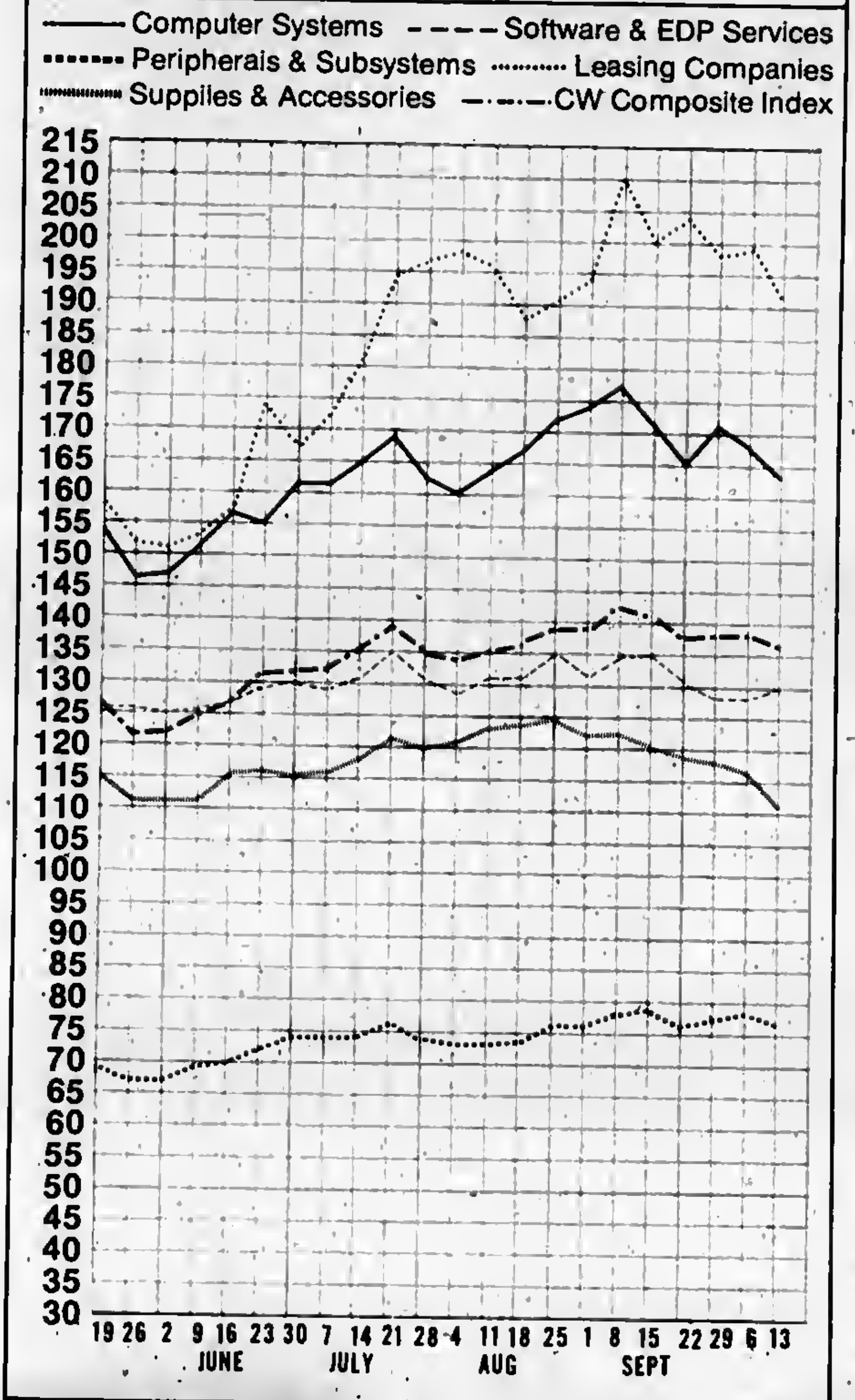

Earnings Reports

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Three Months Ended June 30

	1877	1976
Shr Ernd	$.30	$.20
Revenue	8,548,585	3,237,627
Earnings	278,838	187,838
8 Mo Shr	.87	.57
Revenue	14,009,848	8,730,514
Earnings	828,302	538,043

BUNKER RAMO
Three Months Ended June 30

	1877	1878
Shr Ernd	$.46	$.26
Revenue	90,859,000	81,271,000
Tax Cred	.....	835,000
Earnings	2,802,000	2,287,000
6 Mo Shr	.86	.31
Revenue	173,658,000	164,564,000
Tax Cred	.....	1,350,000
Earnings	4,370,000	3,094,000

BURROUGHS
Three Months Ended June 30

	1977	1676
Shr Ernd	$1.23	$1.05
Revenue	514,822,000	464,300,000
Earnings	48,545,000	42,470,000
8 Mo Shr	1.93	1.66
Revenue	957,428,000	880,573,000
Earnings	77,034,000	88,740,000

CINCINNATI MILACRON
Three Months Ended June 18

	1977	1978
Shr Ernd	$1.32	$.52
Revenue	128,878,000	107,280,000
Earnings	4,833,000	1,940,000
6 Mo Shr	2.44	.93
Revenue	244,882,000	213,453,000
Earnings	8,955,000	3,460,000

DATA 100
Three Months Ended June 30

	1877	1878
Shr Ernd	$.33	$.38
Revenue	33,411,000	28,435,000
Tax Cred	155,000	358,000
Earnings	1,237,000	1,432,000
8 Mo Shr	.86	.64
Revenue	82,348,000	57,718,000
Tax Cred	295,000	485,000
Earnings	2,551,000	2,378,000

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1. Title of publication: Computerworld
2. Date of filing: October 10, 1977.
3. Frequency of issue: Weekly (except single combined issue for the last week in December and the first week in January).
3a. No. of issues published annually: 51
3b. Annual subscription price: $18.00
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5. Location of the headquarters of general business offices of the publishers: 797 Washington St., Newtonville, Mass. 02160.
6. Names and addresses of the publisher, editor and managing editor: Publisher, Patrick J. McGovern, 60 Austin St., Newtonville, Mass. 02160. Editor, E. Drake Lundell, 797 Washington St., Newtonville, Mass. 02160. Managing Editor, Nancy French, 797 Washington St., Newtonville, Mass. 02160.
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10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total number of copies printed (net press run)	84,954	89,248
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	none	none
2. Mail subscriptions	77,328	81,630
C. Total paid circulation	77,328	81,630
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	2,711	2,945
E. Total distribution (Sum of C and D)	80,039	84,575
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	4,915	4,673
2. Returns from news agents	none	none
G. Total (Sum of E, F1 and 2 – should equal net press run shown in A)	84,954	89,248

I certify that the statements made by me above are correct and complete.

W. Walter Boyd
President

TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 12, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE: 1977 RANGE (1)	CLOSE OCT 12 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	41 1/2	+2	+5.0
N	BURROUGHS CORP	55- 91	65 5/8	-2 3/4	-4.0
O	COMPUTER AUTOMATION	18- 30	23 1/8	- 1/8	-0.5
N	CONTROL DATA CORP	20- 26	21 1/8	- 1/8	-0.5
C	CRAY RESEARCH INC	15- 29	23 1/2	- 1/2	-2.0
N	DATA GENERAL CORP	35- 51	44 1/2	-1 3/4	-3.7
N	DATAPOINT CORP	18- 32	29 1/8	- 1/4	-0.8
N	DIGITAL EQUIPMENT	37- 53	44 7/8	-1 5/8	-3.4
N	ELECTRONIC ASSOC.	2- 3	1 3/4	- 1/8	-6.6
A	ELECTRONIC ENGINEER.	8- 11	9 1/2	- 1/2	-5.0
O	FOUR-PHASE SYSTEMS	13- 19	16 7/8	- 7/8	-4.9
N	FOXBORO	42- 54	46 1/4	+ 1/2	+1.0
O	GENERAL AUTOMATION	6- 9	6 3/8	- 1/2	-7.2
O	GRI COMPUTER CORP	1- 1	3/8	- 1/8	-25.0
N	HEWLETT-PACKARD CO	69- 87	74 3/4	-1 1/4	-1.6
N	HONEYWELL INC	44- 55	44	- 7/8	-1.9
N	IBM	245-286	255 1/4	-2 1/8	-0.8
O	MANAGEMENT ASSIST	5- 9	7 1/4	- 3/8	-4.9
O	MEMOREX	23- 34	30 7/8	+1 1/8	+3.7
O	MICRODATA CORP	7- 18	11 7/8	-1 1/4	-9.5
C	MODULAR COMPUTER SYS	5- 8	6 1/2	+ 1/8	+1.9
N	NCR	32- 47	45 1/8	- 7/8	-1.9
O	PRIME COMPUTER INC	12- 23	19 5/8	-1	-4.8
N	PERKIN-ELMER	17- 22	19 1/8	- 7/8	-4.3
N	RAYTHEON CO	16- 33	29 3/4	- 3/4	-2.4
N	SPERRY RAND	32- 42	31 7/8	- 5/8	-1.9
O	SYCOR INC	8- 15	11 5/8	+ 1/8	+1.0
A	SYSTEMS ENG. LABS	5- 8	6 7/8	+ 1/2	+7.8
A	WANG LABS.	10- 14	12	- 3/8	-3.0

LEASING COMPANIES

EXCH		PRICE: 1977 RANGE (1)	CLOSE OCT 12 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 5/8	- 1/8	-2.6
C	BOOTHE COURIER CORP	8- 10	10	- 1/4	-2.4
O	COMDISCO INC	10- 13	12	- 1/4	-2.0
A	COMMERCE GROUP CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	- 1/8	-12.5
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2	- 1/8	-5.8
N	DPF INC	6- 9	8 5/8	- 3/4	-8.0
N	ITEL	13- 22	18 7/8	-1 1/8	-5.6
N	LEASCO CORP	19- 27	23 5/8	- 1/8	-0.5
O	LEASPAC CORP	1- 2	1 1/4	0	0.0
C	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/8	- 1/8	-2.2
N	U.S. LEASING	10- 15	12 1/2	- 7/8	-6.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH.
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SOFTWARE & EDP SERVICES

EXCH		PRICE: 1977 RANGE (1)	CLOSE OCT 12 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	5/8	+ 1/8	+25.0
O	ANACOMP INC	7- 10	8 5/8	+ 1/8	+1.4
A	APPLIED DATA RES.	5- 10	8 1/8	+ 3/8	+4.8
N	AUTOMATIC DATA PROC	23- 30	25 1/2	- 1/4	-0.9
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	9 1/2	-1 1/2	-13.6
O	COMP ELECTION SYSTMS	6- 10	9 1/2	+ 1/2	+5.5
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 3/4	- 1/8	-1.2
N	COMPUTER SCIENCES	7- 9	8 1/2	- 1/8	-1.4
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	0	0.0
O	COMSHARE	5- 8	7	- 1/4	-3.4
O	DATA DIMENSIONS INC	3- 5	3 1/8	0	0.0
O	DATATAB	1- 2	1 3/8	0	0.0
N	ELECTRONIC DATA SYS.	15- 20	15 3/8	- 1/2	-3.1
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4 1/2	+ 1/4	+5.8
O	KEYDATA CORP	2- 3	1 3/4	0	0.0
A	LOGICON	7- 17	11 3/8	- 1/8	-1.0
A	MANAGEMENT DATA	1- 2	1 3/8	0	0.0
A	NATIONAL CSS INC	19- 27	24 3/4	-2	-7.4
O	NATIONAL DATA CORP	4- 7	6 5/8	- 1/2	-7.0
A	ON LINE SYSTEMS INC	16- 22	16	- 7/8	-5.1
N	PLANNING RESEARCH	3- 6	4 7/8	+ 1/8	+2.6
O	PROGRAMMING & SYS	1- 1	3/8	+ 1/8	+50.0
O	RAPIDATA INC	2- 3	2 1/4	+ 1/8	+5.8
O	REYNOLDS & REYNOLD	17- 20	18 3/4	- 1/4	-1.3
O	SCIENTIFIC COMPUTERS	1- 4	4	- 1/8	-3.0
N	TYMSHARE INC	14- 23	19 1/8	-1	-4.9
A	URS SYSTEMS	4- 5	4 5/8	+ 1/8	+2.7
N	WYLY CORP	1- 2	3/4	-	-7.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE: 1977 RANGE (1)	CLOSE OCT 12 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/8	-1	-7.0
O	ADVANCED MEMORY SYS	7- 9	6 5/8	- 1/4	-3.6
N	AMPEX CORP	8- 11	9 1/2	- 1/2	-5.0
O	ANDERSON JACOBSON	3- 5	4	+ 1/4	+6.6
N	APPLIED DIG DATA SYS	10- 20	14 3/8	+ 1/8	+0.8
O	BEEHIVE INT'L	8- 12	9 1/2	- 3/8	-3.7
A	BOLT,BERANEK & NEW	7- 9	8 1/8	- 1/2	-5.7
N	BUNKER-RAMO	8- 12	10 3/8	- 1/2	-4.5
A	CALCOMP	3- 5	3 3/8	+ 3/8	+12.5
O	CAMBRIDGE MEMORIES	1- 4	3 1/4	-	-1.8
N	CENTRONICS DATA COMP	22- 30	21 1/2	-1 3/8	-6.0
C	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6 3/4	- 1/8	-1.8
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3	+ 1/8	+4.3
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
C	COMTEN	9- 13	10 3/4	+ 1/2	+4.8
N	CONRAC CORP	19- 28	20 1/4	- 3/4	-3.5
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 1/2	+ 1/2	+7.1
A	DATA PRODUCTS CORP	9- 17	15 3/8	+ 3/8	+2.5
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/4	+6.2
O	DATUM INC	1- 2	1 3/4	- 1/4	-12.5
O	DECISION DATA COMPUT	2- 3	2	- 1/4	-11.1
O	DELTA DATA SYSTEMS.	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 1/2	+ 1/2	+7.1
O	DATARAM CORP	2- 12	11 3/4	+1 1/2	+14.6
N	ELECTRONIC M.&M	4- 5	3 7/8	- 1/4	-6.0
O	FABRI-TEK	1- 2	1 1/4	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 12	8 3/8	0	0.0
N	HARRIS CORP	28- 39	38 1/2	+ 1/2	+1.3
A	INCOTERM CORP	10- 16	15 3/4	+2	+14.5
O	INFOREX INC	4- 7	4 5/8	- 1/4	-5.1
O	INFORMATION INTL INC	9- 14	11	0	0.0
O	INTEL CORP	38- 57	45	-3	-6.2
A	LUNDY ELECTRONICS	3- 6	4 7/8	+ 3/8	+8.3
O	MSI DATA CORP	6- 13	12 1/4	+ 1/4	+2.0
N	MOHAWK DATA SCI	5- 8	5 7/8	0	0.0
O	PENRIL CORP	2- 5	3 7/8	- 1/4	-6.0
A	PERTEC CORP.	7- 9	8 5/8	+ 1/8	+1.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 5/8	- 1/8	-3.3
O	RECOGNITION EQUIP	6- 10	7 3/8	- 1/8	-1.6
O	SCAN DATA	1- 2	1	- 1/8	-11.1
O	STORAGE TECHNOLOGY	10- 18	15 7/8	- 3/4	-4.5
O	T BAR INC	7- 13	12 1/2	- 1/4	-1.9
O	TALLY CORP.	4- 6	3 3/4	- 3/8	-9.0
A	TEC INC	7- 10	7 5/8	+ 3/8	+5.1
N	TEKTRONIX INC	29- 38	37 1/4	0	0.0
N	TELEX	2- 3	2 3/8	- 1/8	-5.0
O	WILTEK INC	1- 1	3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE: 1977 RANGE (1)	CLOSE OCT 12 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 1/8	- 1/8	-2.0
O	BALTIMORE BUS FORMS	1- 4	1 3/8	- 1/8	-8.3
A	BARRY WRIGHT	10- 14	12 1/2	- 5/8	-4.7
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 1/2	+ 1/8	+0.7
N	ENNIS BUS. FORMS	6- 7	5 7/8	- 1/4	-4.0
C	GRAHAM MAGNETICS	11- 17	17	0	0.0
O	GRAPHIC CONTROLS	13- 18	12 3/4	-1 1/2	-10.5
N	3M COMPANY	48- 56	49 3/4	- 5/8	-1.2
C	MOORE CORP LTD	26- 37	25 7/8	- 3/8	-1.4
N	NASHUA CORP	16- 28	19 1/2	+ 1/2	+2.6
O	STANDARD REGISTER	18- 25	20 3/4	+1	+5.0
O	TAB PRODUCTS CO	10- 19	10 1/4	-5 1/2	-34.9
N	UARCO	19- 22	18 1/2	-1 3/8	-6.9
A	WABASH MAGNETICS	10- 15	12 1/4	+ 1/4	+2.0
N	WALLACE BUS FORMS	17- 21	16 1/4	+ 1/8	+0.6

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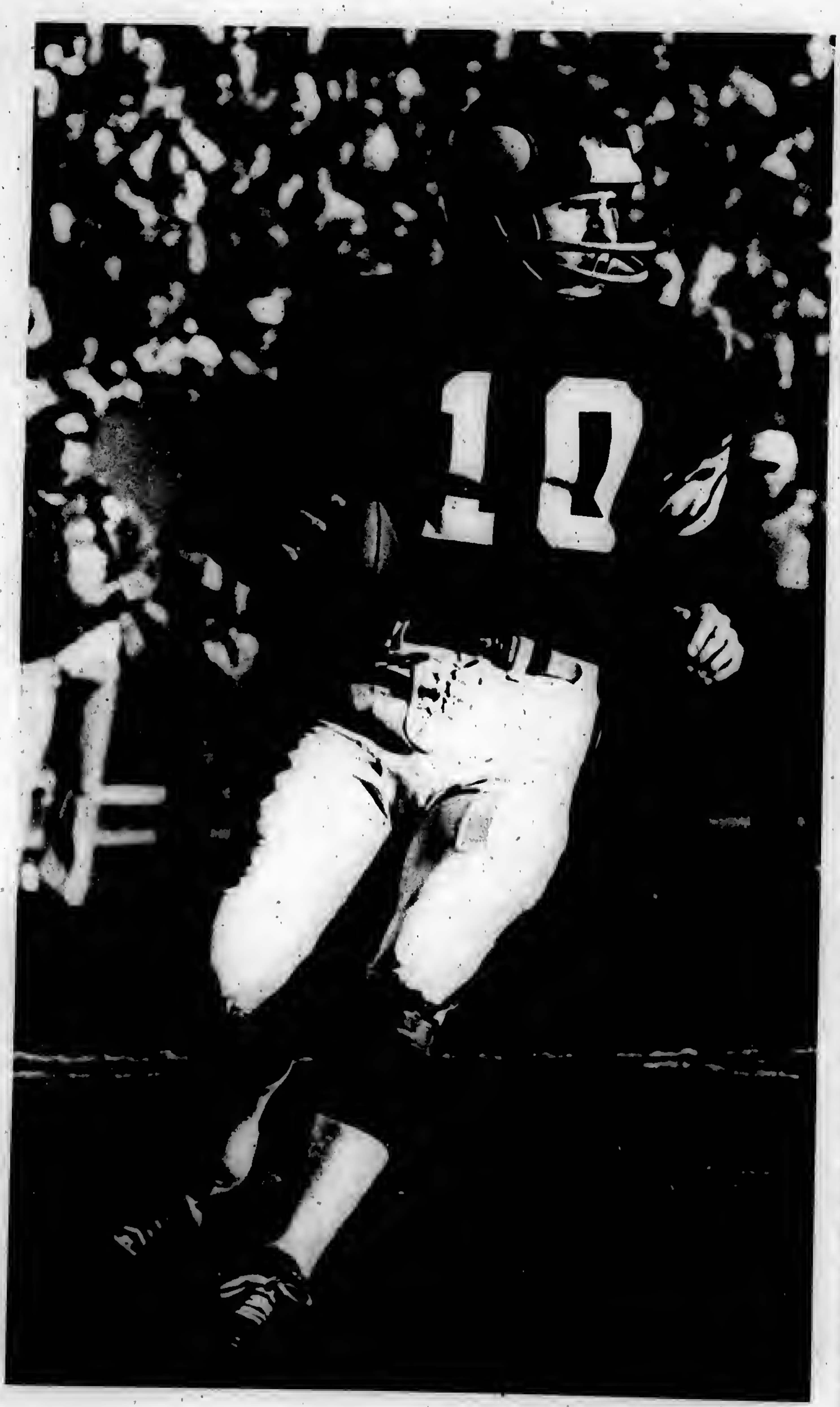

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER

At Info '77 in New York

Users looked

And touched . . .

While in Seattle, ACMers gathered, honoring John Backus. Coverage begins on Page 8.

SRI Faults Management

DP Auditing Found in Poor Shape

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Audit and control procedures have not kept up with new technology and concepts in computer and communications systems design, according to a study conducted by SRI International for the Institute of Internal Auditors that was presented here last week.

Funded by IBM, the study concluded that the top executives of most organizations have abdicated their responsibility to provide resources and direction to internal auditing staffs assigned to minimize losses resulting from computer system errors, omissions and fraud.

SRI mailed a questionnaire to 1,500 large DP users, organizations that spend more than $1 million/year on hardware rental.

Item: Of the 39.7% who answered the questionnaire, mailed to three levels of management at the institutions, 38% had no audit procedures for their computers.

Forty-two percent had a DP audit function, but only one organization in five had performed audits of its computer operation before 1970.

Item: 55% of the top management respondents to SRI's questions believed their internal audit departments were involved in the presystem design and implementation stage of their computer operations. Only 5% of the internal audit departments agreed with this perception.

Item: Only 17% of these large users had internal loss-reporting systems to keep top management up-to-date.

Item: SRI was only able to identify 28 audit tools and techniques used by these organizations to examine their DP operations. Of the four most commonly used tools — audit software, tracing and mapping, test decks and parallel simulation — not one of these was used in as many as one-third of the organizations surveyed.

Item: 50% of the large users provide

(Continued on Page 6)

From Planning to Printouts, Package Manages IBM Sites

By Don Leavitt
CW Staff

CHICAGO — A user that wanted to make its large-scale IBM installation run more automatically developed a package designed to do just that — and the package is now commercially available.

Developed by Kraft, Inc., headquartered near here, and generalized for use by Software Systems Corp. (SSC) of Virginia, Dimension V is, in the words of SSC, a "performance manager" because it combines and coordinates facilities previously provided by a number of separate packages when they were provided at all.

The package supports planning activities; control and adjustment of the workload during execution; follow-up tracking to respond to user queries about job status; and analysis and education related to problems in order to prevent their repetition.

At Kraft, one version of the system is used to run a center that includes an IBM 370/168 and a pair of 158s. Kraft reported "3% to 4%" overhead from use of the system, but noted that with it and several complementary packages, the operations staff has dropped from about 120 to about 60, even though the workload has increased.

The package is essentially an automated scheduler taking into account user-defined resources related to the data center, dependency networks of the work to be done and constraints in terms of the earliest time at which it can be started and the latest time by which it must be completed.

Since Dimension V allows the user to define resources — in the data center in general and in the computer — even before they are in place, the package provides a means of simulating the effect of changes before they are really made, SSC said.

Its primary function, however, is the scheduling and monitoring of actual work as it goes through the center. The resources can include everything from the delivery service to the detailed configuration of as many as eight computer systems, according to an SSC spokesman.

Dimension V can work with JCL libraries cataloged on disk in partitioned data sets or under Pansophic's Panvalet — with adaptation to other library systems seen as minor difficulties at worst. The stored JCL streams can be modified from the operator's CRT right up to the time the job goes under OS control, the spokesman said.

(Continued on Page 6)

Burroughs Gets Early Cue And B6817 Makes Entrance

By Jeffry Beeler
And Frank Vaughan
CW Staff

DETROIT — IBM's introduction of the Model 3031 has prompted yet another mainframer to announce a large-scale computer system ahead of schedule.

The latest offering is the Burroughs Corp. B6817, a multiprocessor-based addition to the B6800 series.

Priced in the same range as the 3031, the B6817 provides 50% greater throughput than Burroughs' B6811 and three times more computing power than its entry-level B6803, according to a spokesman.

A dual-processor version of the B6807, the B6817 is object code-compatible with all B6000 and B7000 systems and accommodates interactive APL, Cobol, Algol, Fortran, PL/I and Basic, the company said.

With Burroughs' Data Management System (DMS-II), Network Definition Language and Message Control System software products, the system will allow users to implement transaction-oriented data management systems

(Continued on Page 4)

Lease Insurance Suspended

By Ronald A. Frank
CW Staff

NEW YORK — The introduction of IBM's 3031 and 3032 processors has resulted in the cancellation of some third-party lease insurance covering the 370/148, 158 and 168.

Most insurance covering third-party leases for the 370s is written by Lloyds of London. After the 3031 and 3032 were announced [CW, Oct. 10], the British underwriter notified its policyholders it is temporarily suspending its coverage on new 370 leases until it has a chance to evaluate the current status of the market.

Lloyds issues the policies to third-party leasing companies which in turn provide users with an escape clause on typical seven-year operating leases. The escape clause allows a user to back out of a lease agreement after three or four years if a later or better machine has become available.

In this situation, the insurance pays the amount due on the lease if the 370 cannot be marketed elsewhere.

According to a source within the U.S. insurance industry here, the notice to

(Continued on Page 4)

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On Capitol Hill

Transborder Data Taking Back Seat

By Edith Holmes
CW Staff

WASHINGTON D.C. — Maintaining the free flow of information across national borders has taken the rumble seat to the passage of energy legislation, the ratification of the Panama Canal treaties and resolution of problems in the Middle East as far as Congress is concerned.

Few people — on and off Capitol Hill — are even aware of the wide range of privacy, economic and national sovereignty issues surrounding possible restrictions on the international movement of data, one congressional aide said following a House Communication Subcommittee hearing held here recently to acquaint members of Congress with the subject.

"Transborder data flow could be of interest to some people," the aide agreed, "but it certainly isn't yet of the magnitude of the Salt [Stategic Arms Limitations Talks] negotiations. There is considerable question that it ever will an important issue area for the U.S." he added, acknowledging that he did not know much about the international flow of information.

White House Action

Meanwhile, the White House has expressed its concern for the U.S. policy void regarding transborder data flow by helping to form an interagency task force on the subject to be run by the State Department under the rules and procedures of the National Security Council (NSC), according to Christine Dodson, NSC staff secretary. The task force will hold its initial meeting this week — on Oct. 26 — to decide how it will proceed.

Ultimately, the interagency task force will present the results of its study to the executive branch which will, in turn, decide whether U.S. policy in this area is warranted, Dodson explained. All of this could take considerable time, a White House aide said.

One of the more knowledgeable members of Congress in this field, Rep Barry M. Goldwater Jr. (R-Calif.), plans to encourage the interagency task force in its efforts.

Commenting on the lack of congressional and public interest in the international flow of data, Goldwater suggested that "at the moment, the issue looks terribly exotic — almost of a Buck Rodgers quality."

An author of the Privacy Act of 1974, the congressman is particularly concerned that the privacy issue might become "a Trojan horse" for the political and business interests of European, Far East and third world nations.

Shutting Out Business?

Protective privacy legislation has been passed or has been proposed in several countries, and along with others, Goldwater fears the trend toward keeping data at home really equates with shutting U.S. business interests out of foreign countries.

The U.S. has an obligation to be involved in the transborder data flow issues, based on the merits of privacy itself from an economic viewpoint, he said. He hopes for a "commonality of privacy status between nations."

Goldwater is not alone in his interest in this field. During the panel discussion of transborder data flow before the House Communications Subcommittee, Rep. Louis Frey Jr. (R-Fla.) pressed business and government representatives at the hearing for a report on how well the U.S. presented its position at the Organization for Economic Cooperation and Development (OECD) conference in Vienna last month.

At that meeting, U.S. representatives expressed strong feelings about the importance of moving slowly on any form of international agreement that could restrict data flow. They seemed to have persuaded some conferees to adopt their view [CW, Oct. 3].

However, at another meeting only one week later, the Council of Europe's Subcommittee on Legal Affairs, acknowledging its mandate to adopt some type of international transborder data/privacy convenant, agreed to continue to refine a draft agreement already under consideration — with or without American participation [CW, Oct. 10].

The lack of a national policy on the international movement of information "is as much the Congress' " fault as anybody's, Frey said at the hearings. "Aren't you in trouble?" he asked panel participants from Systems Development Corp., Scientific Time Sharing Corp., General Electric Co. and Control Data Corp.

"The government is abolutely not representing U.S. interests in this matter," one panel member responded. "We alone are not fully aware that we are at economic war with the rest of the world. We will do our nation a disservice if we don't elevate this discussion," he maintained.

House Communications Subcommittee chairman Rep. Lionel Van Deerlin (D-Calif.) has expressed interest in the issue, but he is described by a staff member as "swamped" with the revision of the Communications Act of 1934.

Foreign relations specialists for Senators George McGovern (D-S.D.) and Charles Percy (R-Ill.) are currently on a European trip to discuss international communications issues with representatives of a number of nations. These aides plan to talk with OECD members and others to try and assess European feeling concerning transborder data flow, one of the specialists said.

Another Senate aide confirmed that there is a joint resolution on the subject of international data movement in the works, but added that the resolution is far from ready and certainly won't be out before Congress adjourns this year.

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That's what happened in this case. Those industrious and ingenious elves in the dark forests around Armonk didn't fail us. They came up with a couple of winners in the new "eights."

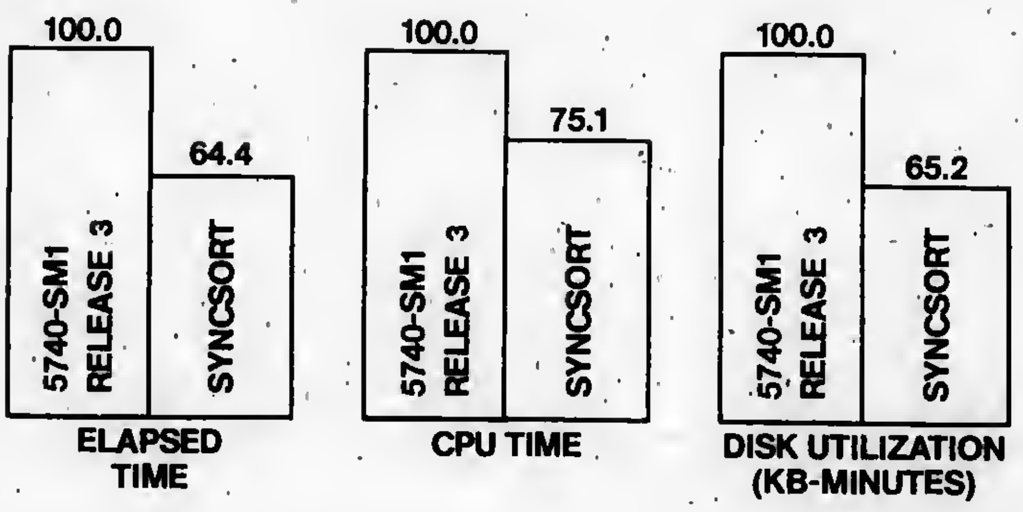
Our friends who put out the *EDP Industry Report* — the "Gray Sheet" — assessed the importance of the new 138s and 148s as follows:

> "Perhaps the biggest single development of 1976 was IBM's introduction of two new 370s . . . and new price/performance curves to go with them . . ."

We couldn't agree more. The new "eights" really do yield more "bang for the buck" as the Gray Sheet puts it.

But we'd like to add a footnote to that: The bang will be considerably louder if you sort with SyncSort rather than IBM's 5740-SM1, Release 3. (*It* must have been made by a *different* bunch of elves.)

If you'd care to prove that for yourself, just try a couple of benchmarks comparing the two sorts on exactly the same files. You'll see a picture of resource usage that looks like this:



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No Telex Traffic, Packet Nets Say

By Ronald A. Frank
CW Staff

ATLANTA — Telex messages will not be allowed on the emerging public packet networks, according to statements made by foreign carrier representatives at a recent conference here.

Diversion of traffic from the Telex network to the new services must be done "in a controlled manner" so existing service will not be affected adversely, George Orchard of the British Post Office told attendees at the International Telecommunications Exposition (Intelcom 77).

Jean Picard of the French postal, telephone and telegraph (PTT) authority said future Transpac packet net CPUs will receive messages from a Telex terminal or users will be able to dial from a Transpac host into Telex, but terminal-to-terminal Telex traffic will not be possible using Transpac facilities.

International Messages

Asked whether Telex terminals would be able to transmit international messages, Picard said they would as long as the message were being sent from a Telex terminal to a host CPU.

Picard admitted. the restriction against terminal-to-terminal traffic is a short-term position of the PTT and in the long run all types of terminals should be able to talk to each other.

Maurizio Decina of the Italian telecommunications administration agreed that Telex messages will have to remain on the Telex network initially. In the longer term, however, the user will have to be concerned only about the performance characteristics of a network and will be able to interface all types of devices with each other.

Turchin Gets Nod to Leave

LENINGRAD, USSR — Dr. Valentin Turchin, a computer scientist in disfavor with Soviet officials since 1973, has been granted permission to leave the Soviet Union and immigrate to the West.

Turchin headed a laboratory at the Institute for Automated systems until he was reportedly dismissed after protests over government treatment of Soviet dissidents [CW, Aug. 13, 1975].

Harrassed by the KGB and blacklisted from working in his professional field, Turchin came to believe his only real alternative was to leave the Soviet Union, sources said.

His case received widespread publicity, especially within the computer industry, and such groups as the Association for Computing Machinery and the Committee of Concerned Scientists, as well as individuals, wrote letters of protest to the Soviet government [CW, Dec. 10, 1975].

However, their efforts accomplished nothing until very recently, when pressure increased as a result of Turchin's protests over the much publicized case of dissident Anatole Sharansky [CW, Aug. 22].

Although it is difficult for outsiders to determine any clear reason for Turchin's final release, his "resoluteness," combined with pressure exerted from without, probably expedited the permission to immigrate, according to Mark Mellman, executive director of the Committee of Concerned Scientists.

Turchin, who is reportedly en route to the US. with his wife and two sons, will accept an invitation to teach at Columbia.

Lloyds Suspends Lease Insurance on 370s

(Continued from Page 1)

lessors was issued so the underwriter can get an accurate perspective of the market for large 370s. Lessors with insurance policies were asked to provide the underwriter with a description of their current portfolios as part of this evaluation, the spokesman said.

"The question is how much the 148s, 158s, and 168s have been impacted by the 3031 and 3032," he added.

The Lloyds notice did not specifically prohibit policyholders from negotiating new leases if they are willing to comply with any restrictions that Lloyds may require after the current moratorium has ended. In practice, the lessors will probably wait to see what those resrictions will be before proceeding, according to another industry source, who said that may be why some lessors have not been returning calls from customers.

Lloyds began to insure third-party computer lease plans in late 1974. It has placed a similar embargo on new leases several times since then.

The last time was in June 1976, after the IBM 370/138 and 148 introductions. When that moratorium was lifted two months later, Lloyds required lessors to underwrite 20% of the value of the insurance policies with their own funds.

Although experts believe the current embargo will last only several weeks, none is willing to predict what new restrictions Lloyds will place on the 370 leases.

Three Options

Three options apparently are available to the British underwriter: continue the policies as before; set up new restrictions; abandon the 370 lease market entirely.

Most experts believe the last alternative is a slim possibility since the larger 370s still have an estimated useful life of at least two years for leasing purposes.

Companies believed to be affected by the Lloyds notice are Itel Corp., DPF, Decimus, Alanthus, LFC, and National Computer Rentals, according to industry sources. Lloyds has written about 20 policies for firms in the computer leasing businss, sources said.

One firm that was not affected by the Lloyds action is Computer Finders, Inc. of Hackensack, N.J. According to Tom Martin, president, the company has three money sources that are continuing to write leases on the 370s, although the leases may be written at slightly higher rates than ones previously written by the firms which have Lloyds insurance policies.

Small Portion Affected

One industry source said only a small portion of the 370 leases that were being written was affected by the Lloyds insurance and that longer term leases did not use the Lloyds coverage.

The exact effect of the Lloyds notice was a subject most lessors refused to discuss. Once source admitted potential customers who know a lessor is in a difficult position might be able to negotiate a better lease.

Leasing companies that were contacted refused to comment on the situation. A spokesman for one such firm said, "We have completed our 370 program, but in any case we would not want to discuss any of our lease insurance arrangements."

Correction

In a story concerning the Council of Europe's move toward a data protection accord, [CW, Oct. 10], the Council of Europe was incorrectly referred to as the European Economic Community (EEC) in both the headlines and the first paragraph. EEC countries are members of the Council of Europe, but the council also has about 10 other member nations that are not EEC members.

Burroughs Debuts B6817 With 3031-Range Price Tag

(Continued from Page 1)

and on-line communications networks, the spokesman added.

A Master Control Program (MCP) manages all B6817 hardware and software resources, according to the spokesman, who noted the system can be configured with the recently announced Attached Fortran Processor.

The B6817 uses two levels of directly addressable memory — Global and main. Global memory, which primarily serves applications like master scheduling, allows the system's CPUs to operate in a multiprocessor or a shared-resources mode.

In the multiprocessor mode, the MCP manages all the system's resources and allocates them as needed to the various jobs being processed, the spokesman explained.

In the shared-resources mode, each system manages its own job streams and resources. This arrangement allows the CPUs to operate independently, communicate with each other and share common data bases, the Burroughs official noted.

A basic B6817 system consists of two CPUs operating at 6.67 MHz, two I/O processors with a minimum of 20 channels each, two maintenance processors and displays and two operator consoles with dual displays.

Users can expand the system to accommodate up to four CPUs, four I/O processors and 16 data communications processors serving 4,096 lines, the company said.

A typical configuration holds 2.2 million bytes of memory, but the B6817 can operate with as little as 786K bytes of main memory and 786K bytes of Global memory, expandable in 393K-byte and 786K-byte increments, respectively, to a totoal of nine million bytes, the firm said.

With additional processors, the system's total directly addressable memory capacity can expand still further to 15,360K bytes. Both main and Global memory access is 325 nsec at the bus level, the spokesman said.

An entry-level B6817 with 2.2 million bytes of memory sells for $975,000 or leases for $27,225/mo on a one-year contract that includes around-the-clock maintenance. Additional Global and main memory cost $72,000 per increment or $2,300/mo on a one-year contract, while the price of additional processors is $34,800 or $970/mo. Burroughs is headquarterd at Burroughs Place, Detroit, Mich. 48232.

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GAO Hits Conversion Procedures

U.S. Wasting $100 Million/Year on Software

By Molly Upton
CW Staff

WASHINGTON, D.C. — The federal government could save about $100 million a year if agencies making hardware changes improved their software conversion procedures, according to the General Accounting Office (GAO).

The agencies do not even consider conversion costs when they award contracts for new computing equipment, the GAO told congress in a report entitled "Millions in Savings Possible in Converting Programs From One Computer to Another."

The report suggested one way to recoup some of that $100 million might be to establish a federal center for software conversion.

Conversions from one machine to another, including upgrades, cost the government more than $450 million annually, the GAO learned from a questionnaire answered by 2,470 government programmers and supervisors. The $100 million and $450 million figures were extrapolated from the $6 billion the government annually spends on software. Of that $6 million, $3 billion goes for maintaining and converting programs.

The GAO estimate of $450 million for software costs consists of $25 million for conversion of programs acquired from outside sources and over $425 million for software conversion costs incurred when agencies replace one system with another.

Derivation of Figures

The GAO derived the $425 million figure by taking one-seventh of the $3 billion annual expenditure for maintaining and converting programs because it considers seven years the typical life span of a hardware system. It also took one year as the typical time for conversion of an installation.

The $25 million for outside program conversion was derived from programmers' estimates of the percentage of their time they spend converting outside programs as well as the cost to the General Services Administration (GSA) of a software staff-year.

Although government programmers and supervisors estimated about 40% of costs could be saved, the GAO took the more conservative 24% figure offered by independent experts and thus arrived at the over $100 million figure.

Included in the costs of conversion were delays in user tasks, labor, retraining, interference with other uses of the computer, morale and documentation.

The survey also revealed that programming incorporating the features unique to a particular machine contributed significantly to the cost of conversion later.

The suggested federal center for software conversion would be established with assistance from the Office of Management and Budget.

The GSA could participate by being authorized to require the center to provide independent conversion estimates for expensive agency procurements that have significant conversion costs, the report suggested.

The center should provide services such as impartial estimates of the conversion implications of system procurement alternatives; some capability to actually perform conversions; and a mechanism for transfer of lessons learned to future software conversions, development and procurements, the report said.

Having conversion expertise reside in one place would be helpful since an installation normally converts every five or 10 years. These installations generally do not have many people who either know conversion techniques or recall how it was done the last time.

In addition, the center could also assist agencies in converting programs collected by GSA's recently established Federal Software Exchange Center, the report observed.

The U.S. Navy and the GSA are currently developing plans to establish such a conversion center, the report noted, adding this is a step in the right direction.

Quality Important

More emphasis on quality in the original development of software and documentation would ease eventual conversion problems, according to the report.

Furthermore, the possible greater cost would be more than offset by easier conversion and modification, fewer errors in the supported user tasks and more feasibility of sharing the software among multiple users, the report indicated.

Regarding standardization of languages among manufacturers, the GAO indicated management should require that use of vendor-unique features be justified by savings in operating costs.

Another means of restricting the use of vendor-unique features would be to require vendors to sell to the government programming language compilers that include only the standard language, the report said.

The report also recommended that the National Bureau of Standards (NBS) select and publish a set of programmer productivity aids.

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ACMers Young and Loyal

By Don Leavitt
CW Staff

SEATTLE — The Association for Computing Machinery (ACM) is a youthful organization: 75% of its membership is 40 years old or younger, according to survey results published in the current *Communications of the ACM* and distributed in reprint form at the annual conference here last week.

The membership is loyal, too, the study begun two years ago found. Sixty-five percent of the members responding to a questionnaire belong only to ACM.

Fifteen percent also belong to the IEEE Computer Society, but no other outside group attracted as much as 3% of the ACM membership, according to Thomas A. D'Auria, chairman of the membership committee and author of the report.

The association's reputation as a "home" for academic and scientifically oriented people was confirmed by the survey, which garnered some 18,200 responses from the approximately 30,000 members. Thirty percent of them "have employers in the education field" and more than 55% are in the scientific, systems and research area, D'Auria wrote.

Only 16.7% are commercial users of computer systems, he added.

ACM members have a high education level, according to the membership chairman. Nineteen percent have doctorates and 37% have master's degrees.

Of those with degrees — including bachelor's — 29% majored in computer science, 24.5% in math and 11.5% in electrical engineering.

Only 5.6% have degrees in business-related disciplines, D'Auria noted.

The members' top two areas of major technical interest are software systems design/programming/implementation (22.4%) and data structures/data base management/data retrieval (12.6%), the report showed.

Higher level languages, applications and operating systems — the next three interest areas — all fell in the 8% to 9% range, according to the survey.

When comparing job title for function with purchasing authority, the high buying power of ACM members is apparent, according to D'Auria. Forty-five percent of the respondents said they are senior professionals.

These figures are "especially interesting," the report continued, when considering the fact that 63.9% of the respondents purchase or recommend purchase of at least one type of computer equipment or service.

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Package Developed by User Manages Large IBM Sites

(Continued from Page 1)

In the event of an inquiry or a problem, the operator can call for a display of job status and, if needed, make adjustments to cope with new situations. Jobs can be reassigned from one CPU to another, for example, if one goes down.

Job-by-Job Basis

The reassignments are made on a job-by-job basis, SSC pointed out, so critical work can be handled immediately and other jobs delayed if a hardware failure disrupts normal schedules.

Although the spokesman indicated a global reassignment facility might be included in a later version of Dimension V, he noted that would be inappropriate for the package's normal purpose.

The job status reports indicate not only work still to be done, but work done during the current scheduling period. Thus a job run in the morning would still be shown in the afternoon and the operator could determine then if and when printing of the output was completed.

Since workload schedules vary from time to time to handle holidays and special requirements — quarterly and other periodic reports, for example — Dimension V was designed to support selection from among multiple, predefined calendars. Each calendar can include unique dependencies and start/-deadline times even if the jobs involved appear to be unchanged, SSC said.

Batch Version Available

Available now in a batch version, Dimension V will also have an on-line implementation before the end of the year, according to the vendor. Since the product incorporates most of the capabilities of both Deadline and Streamline, SSC's previous scheduling packages, there will be no further development work on them.

They are "functionally stabilized," although user support and error correction work will continue "especially for those with current maintenance agreements," the spokesman said.

Dimension V functions under any OS environment, he added, and the batch version is available to current SSC clients for $4,200 plus $1,000 for on-site installation and training. SSC clients without maintenance agreements will be charged an additional $2,500.

For new users, Dimension V-Batch costs $35,000 while the on-line version will cost $60,000, SSC noted from Suite 410, 7900 Westpark Drive, McLean, Va. 22101.

DP Auditing in Bad Shape, Managers Hit for Failure

(Continued from Page 1)

no training or professional development for their DP auditors whatsoever. An additional 45% spend less than 5% of their internal audit budgets on training. SRI found that only one organization in 20 considered auditing important enough to spend $1 in $20 on training auditors.

No Longer Impregnable

SRI's three-volume report entitled "Systems Auditability and Control" maintains that it is no longer possible to build a fortress around the computer system to prevent losses.

Communications capability automatically makes the fort a leaky bastion. The time has come for DP auditors to audit the black boxes as well as the environments around them, SRI contended.

Seven man-years of effort and $1 million convinced SRI that there has been a "clear failure on the part of the EDP audit field to keep pace with the management information systems environment."

SRI's survey of large-scale system users in the private sector and in government indicated management generally operates under "gross misconceptions" of the auditing function in its company.

Too busy, believing that auditing is dull and uninteresting, top management has not accepted the fact that the responsibility for overall internal audit control belongs in the head office.

Internal audit must involve itself to a greater extent in DP audit use and design. The internal audit function can do so without losing the independence needed to make an examination of the system, SRI maintained.

Further, the only way an organization can effectively minimize its losses is to regularly and carefully assess the DP audit controls it has in place, SRI noted.

Twenty-eight audit tools simply aren't enough, given the number of systems in a large organization, the number of languages that can be used to program those systems, the number of applications they handle and the number of people who will use the system. Multiply all these factors together and 28 seems a very small number, SRI's Joe Hootman said in presenting the report.

Finally, the quantity and expertise of DP audit personnel needs to be increased, he said. Training should emphasize the real world and include plenty of workshop experience.

Top management sets the tone for the entire organization. In the interest of minimizing "financial surprises" and increasing efficiency, this level of the organization needs to recognize the importance of the internal audit and DP audit functions.

The organization's leaders need to clearly define the roles of users, internal auditors and DP auditors, articulate a "comprehensive internal audit mandate" and require control guidelines and standards so that the people directly responsible for auditing can get their jobs done, SRI said.

Finally, top management needs to support innovation — through new audit procedures and new control techniques — to ensure system reliability.

No Action on DP Crime Bill This Year

Washington Update

By Edith Holmes
CW Staff

WASHINGTON, D.C. – Congress' first attempt to make misuse of computer systems a crime probably won't receive any further attention from the legislature until next year.

Stalled in the Senate Judiciary Committee's Subcommittee on Criminal Laws and Procedures is a bill that would make abuse of systems operated by the federal government, certain financial institutions and firms engaged in interstate commerce an offense punishable by a jail term of up to 15 years and/or fines of up to $50,000.

S. 1766, introduced by Sen. Abraham Ribicoff (D-Conn.) this summer [CW, July 4], will be reintroduced in the Senate at the beginning of the next session of the 95th Congress, a spokesman for the committee said.

House Fails in Try To Halt Revamp Plan

President Carter's "Reorganization Plan No. 1" went into effect last week following the defeat of a House resolution to disapprove it and a favorable Senate response to the changes the plan will make.

Among those changes are the distribution of the Office of Telecommunications Policy's (OTP) functions among the White House, the Office of Management and Budget (OMB) and the Commerce Department [CW, Aug. 15].

The House Government Operations Committee, headed by Rep. Jack Brooks (D-Texas), recommended Congress approve the reorganization plan, but added to its report some critical words about the confusion which the redelegation of OTP functions could foster.

Congressional complaints led the President's reorganization team to amend the plan for OTP to place all policymaking functions with the President for reassignment within the executive office. The original plan split the policy responsibilities between Commerce and Carter, causing members of Congress to fear "serious duplication and overlap."

Missing 'Information' Gives Rise to Rumors

Commerce Secretary Juanita Kreps has recommended to President Carter that Henry Geller, a fellow at the Aspen Institute, be nominated to the new post of Assistant Secretary for Communications and Information.

Former counsel of the Federal Communications Commission (FCC), Geller has yet to be nominated by the President. He must then be confirmed by the Senate before assuming the Commerce Job, which combines the department's Office of Telecommunications (OT) with the staff and many of the functions of the soon-to-be-dissolved White House Office of Telecommunications Policy (OTP) [CW, Sept. 26].

In the press release announcing Kreps' decision in favor of Geller, the Commerce Department called the position for which he has been recommended "Assistant Secretary for Telecommunications," giving rise to rumors that the information policy functions will be dropped from the job.

Sources in Congress, the Office of Management and Budget (OMB) – who are writing the executive order defining the new Assistant Secretary's job – and in the Commerce Department itself deny these rumors. Carter ordered the creation of a position for an Assistant Secretary for Communications and Information in his federal reorganization plan, so that title will remain, they said.

Why the Commerce Department release used the word "telecommunications" and omitted "information" in the title remains a mystery. One explanation is that the public affairs office in Commerce, which is called "Communications," feared public confusion over this new post.

DP Policy Not Part Of Revamp Parcel

The Carter Administration's look at federal DP won't result in the creation of a national information policy, Congress learned from the Office of Management and Budget (OMB) last week.

The federal DP reorganization study [CW, Oct. 10] will focus on "the use of a technical resource," Wayne G. Granquist, associate director for management and regulatory policy at OMB, told the House Administration Committee's Policy Group on Information and Computers.

At the same time, Granquist hinted that OMB and the executive office are talking about a project that would involve the formation of a U.S. information policy. He promised Rep. Charles Rose (D-N.C.), the policy group's chairman, that OMB will "be able to say more about this" in two to three weeks.

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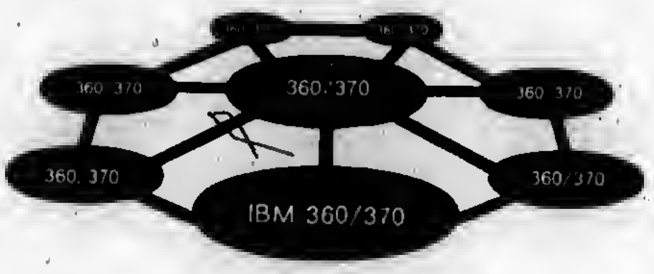

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DP Departments Urged To Tell — Not Ask — Users What They Need

By Molly Upton
CW Staff

NEW YORK — DP managers should stop asking corporate users what they want. Instead, DPers should tell them what they need to achieve corporate goals, according to Joseph J. Carr, vice-president of information systems and services at American Can Co.

The DP manager must be able to demonsrate that he knows as much about the user's particular business and problems as the user does, Carr told a session at the Information Management Exposition & Conference (Info '77) here last week.

Carr likened the position and authority of information systems and services at American Can to that of research and development, noting that managers are accustomed to working through R&D for specific projects. Now managers have to have approval for projects and systems from the DP department, he said.

A key element in the department's position is knowledge of corporate ground rules and long-term goals, he stated. With these, Carr's department can ensure that what an operating unit gets is consistent with corporate policy and objectives, he said.

Matrix Management

American Can has adopted a matrix management structure for its 20 business units; each manager of a business unit has full responsibility. However, American Can also has corporate resource functions such as personnel and R&D, Carr explained.

As VP of data processing, Carr reports on a par with managers of business planning and business control to the senior vice-president of operations control, he said, adding he is thus in a position to participate in planning. He is also on the corporate policy board, a subset of the management executive board.

Carr's department assumes an active initiator role because a business unit might not know what's right for it, he said. Also, many managers don't see the implications of what they want to do, "so we direct rather than respond," he added.

One reason Carr's department can maintain its position of authority is that it has undergone a major upgrade in the business quality of its people, he said. The DP department recruited line managers with systems experience; given the right technical support, they can communicate with business, he said.

Another important element in planning is merging business planning and systems cycles, Carr said. No business plan is complete without an accompanying system plan, he added.

Carr has four groups within his department that are on equal footing when planning is considered — systems development, information management, facilities management and operational control.

As part of the transitjon to the new management structure at American Can, the firm set up an interim systems plan.

The DP department looked at projects that were in the hopper and either killed or approved them. It took 50 projects and merged 40 of them into eight areas of major thrust.

CW at Info '77

It also gained a better balance of long- vs. short-term projects, which allowed establishment of broad targets, such as spending 70% of systems dollars on upgrades or new developments.

Projects that were good for an individual operating unit but inconsistent with overall corporate direction were either eliminated or deferred, Carr said.

Directional Plan

The directional plan should provide a framework to get strategic information direction consistent with long-term corporate goals, Carr said.

A key element of the directional plan involves management giving DP the ground rules so DP can assess where the corporation is going and analyze requirements and functional development. DP's business strategy is to demonstrate that it can provide cost reductions.

In some cases, Carr said, the DP department has gone to some other unit with ideas on how to cut costs and has shown savings from the new system will fund development for that system.

Carr's staff numbers 425. The two corporate DP centers in New Jersey and Connecticut have about five IBM 370/158s and two 145s. There are about 40 smaller systems such as Burroughs Corp. B700s and IBM System/3s in the field; major subsidiaries have stand-alone systems, usually 145s or 158s.

Atwood Elected DPMA President

WASHINGTON, D.C. — Delbert W. Atwood Jr. of the Utah State Board of Education has been elected 1978 international president of the Data Processing Management Association (DPMA).

The election of the association's international officers was held during the recent Info/Expo '77.

Atwood, systems coordinator in the DP division for the State Board of Education of Utah, will assume the duties of his office Jan. 1.

Atwood has been involved in DP for more than 21 years and has been a member of the local Great Salt Lake Chapter of DPMA since 1957. He earned the Certificate in Data Processing in 1962.

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Integration Seen Key to Managing Information

By Molly Upton
CW Staff

NEW YORK — Information management will evolve when firms can view the computer, office and telecommunications systems as components of an integrated system, according to David S. O'Dwyer, marketing manager of AT&T's strategy group.

A necessary precursor of this integrated information management is the implementation, but before integrated information management systems arrive, standards must be developed regarding input and extraction of information, O'Dwyer said.

As the scope of the overall information management process is recognized and as the communications stream becomes digital for all office solutions, vendors must broaden their product lines to address the different facets or else die out, he indicated.

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O'Dwyer, addressing a technical session at the Information Management Exposition & Conference (Info '77) here last week, referred to this as "vendor blurring."

To supervise the various areas of communication, processing and media conversion, firms will need an information systems director who will have those in charge of personnel needs reporting to him so he can make the tradeoff between people and machines.

Currently, vendors addressing the paper-oriented office functions of today tend to focus on increasing the productivity of the typist or secretary, and this does not always increase the productivity of the manager, he said, noting that in order to look at the totality of information management, one would consider the different components, functions and modes that comprise the computer, office and telecommunications systems.

Such an examination will point out the overlapping functions and also the feasibility of increasing price/performance, he said.

Because the processing element has been declining in cost more rapidly than transmission, O'Dwyer said users will utilize processing even more to trim their overall costs and processing will dominate all systems solutions at an ever increasing rate.

Furthermore, processing will encourage the integration of video with other modes, he said. Changing office procedures from the unstructured, stand-alone paper procedures of today to the highly structured solution inherent in a systems approach will take a long time and should be considered a change of an evolutionary nature, he explained.

The major evolution will occur when the secretary and the preparer have joint access to the information, he said. But with the dynamic growth in the use and improvement in facsimile equipment, users can stay with their paper and old filing systems, he pointed out. Another instrument that offers significant capacity for change is the ubiquitous telephone, he said, adding that Bell's Transaction Telephone could be a precursor to an intelligent telephone.

Transmission of characters, image and voice will ultimately be integrated into one information system, he said. As the market for this type of service is expected to become huge, O'Dwyer predicted the number of vendors should increase substantially.

Cognitive Tasks Topic of Study

BUFFALO, N.Y. — A professor here at the State University of New York is attempting to discover just how far computer programmers can go in feeding "human" traits into computers.

Dr. Nicholas Findler, aided by an $80,000 grant from the National Science Foundation, uses such games as chess and draw poker as vehicles for his experiments in machine cognition. During these experiments, humans play through a teletypewriter connected to a central computer.

The human subjects, however, do not know which players are computer programs and which are human. In this way, Findler hopes to study the thought processes involved in decision making under conditions of uncertainty and risk. This information could assist in developing computer programs in which the machine could improve the level of its performance on the basis of previous experience.

Findler described three areas involved in his studies:

1) A machine intelligence-oriented area which will study ways in which the performance of computer can be enhanced to make it more powerful.

2) A psychology-oriented approach that will establish computer models of various cognitive tasks.

3) A method for determining ways in which humans can be taught to become good decision makers.

Although such "artificial intelligence" may make the educated layman feel that computers might dehumanize society, Findler hopes to eventually save people from monotonous routine activities so they can exert more effort for creative pursuits.

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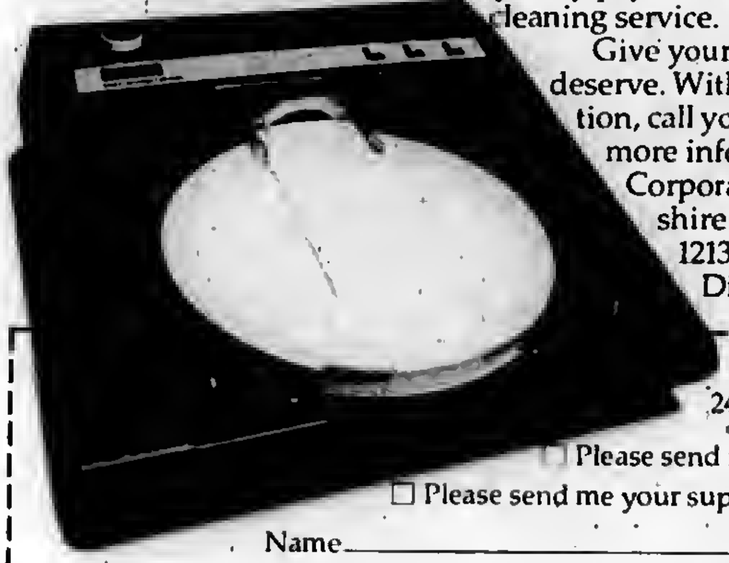

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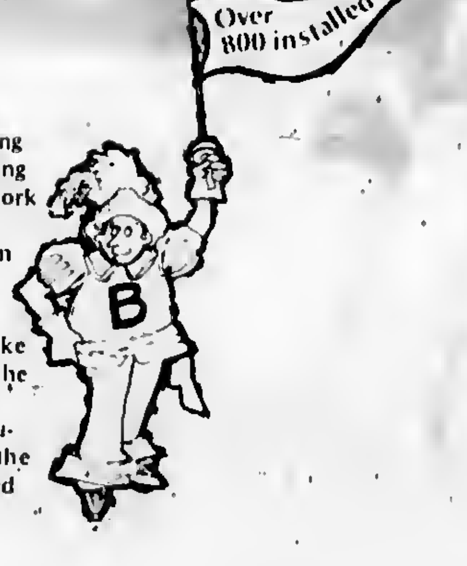

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CW at Info '77

In Evolution of Mainframes

Era of 'Polyprocessors' Viewed Near at Hand

By Ann Dooley
CW Staff

NEW YORK — Generations of large mainframes have been evolving every five to seven years, and the generation of the "polyprocessor" lies just ahead, Robert Spieker, director of Data Systems Operations for AT&T, predicted here last week.

Speaking at a session held as part of the Information Management Exposition & Conference (Info '77), Spieker attributed to generational changes the forces of technology, architecture and applications.

They interact with each other and evolution occurs when one or another changes, he explained.

Speed and reliability of computers have increased by a factor of 10 in the last five years and storage capacity has increased by a factor of 100 in that amount of time, according to Spieker.

Hardware costs have decreased by a factor of 10 in the last five years as a result of faster speeds and the reduced cost of large systems. The size, weight and power have also decreased by a factor of 10 in the last five years.

Although technology has created changes, it has also imposed constraints such as the speed of light, frequency, space, time and other irreversible components, he explained.

In order to minimize technology constraints, the size of the system can be reduced as was done in the case of a computer on a chip. Alternatives can also be selected which would include large unit processors, linked small systems or polyprocessors, he said.

The characteristics of a large unit processor include the best cost/-performance, minimizing interfaces and flexible partitioning, but also include some stability problems, resource mix constraints and large growth increments, he said.

Characteristics of a linked small processor include managability, which would make interfaces unimportant, acceptable performance and small growth increments so that a mini can be added for little cost, he said. The linked processor would also be artificially partitioned, would have high storage costs, a high cost of linking and resource constraints, Spieker said.

Major Advantages

The polyprocessor would be manageable, although not to the extent of the unit processor. It would be flexible, easily configurable and stable, and it could minimize resource constraints, have small growth increments and software partitioning, he said. According to Spieker, the polyprocessor will be the most common system.

The design goals of a polyprocessor include reasonable flexibility, speed, stability and predictability and reasonable increments of growth and balance, he said.

The polyprocessor will have a number of CPUs, each doing its own job, according to Spieker.

Price/performance will drop significantly, he predicted, and there will be substantial differences between the main processor hardware characteristics.

Polyprocessor software structure will include a migration from software to microcode and wired logic, Spieker said. Further, there will be much more user-built microcode in 1985 designed to the user's own needs.

Other changes in structure will include value-added-layered software, distributable operating systems and self-observation and diagnosis, he added. Software will still be on tape but will also be on floppy disks and chips that are already embedded, he said.

The host processor in a distributed system would have a number of levels such as polyprocessors, unit-processors, miniprocessors and microprocessors. The computer would be at the top of the hierarchy with a remote processor, a switching processor and a front-end processor, he said. Future trends will be toward increased processor performance, greater storage capacity and functional specialization.

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Von Neumann Orientation Wrong

Languages in Deep Trouble: Turing Winner

By Don Leavitt
CW Staff

SEATTLE — Although a number of people feel conventional programming languages have reached maturity, John Backus, an IBM fellow at the firm's San Jose, Calif, research center, disagreed sharply with that view as he accepted the A.M. Turing Award from the Association for Computing Machinery (ACM) in convention here last week.

The soft-spoken lecturer said he feels most language work today is in deep trouble. The languages are too cumbersome, and the Department of Defense's planned 1,000-page manual on its proposed standard language is symptomatic of the problem.

Few generalized languages have really good payoffs; that's why "small, precise" languages such as Pascal are still popular, Backus said. Conventional programming languages "confuse the way we think in programs. We tackle a myriad of details instead of new ideas" to solve the particular real problem.

CW at ACM '77

The problem with current languages — including Fortran and Algol, both of which he helped develop — goes back to the initial concept of the digital computer put forth by von Neumann. The vision of a central processing unit, a main storage medium and a single connector or queue between them was an elegant idea, Backus acknowledged, but times and hardware technology have changed and languages haven't.

The CPU-storage connector is the bottleneck in the original concept. It allowed only a single word - whether data or instruction — in the conduit at any one time.

Because it was the environment in which they had to function, most conventional programming languages have been built to work through the von Neumann bottleneck, Backus explained.

Mimicking the action of the bottleneck required the introduction of variables, control statements and assignment codes. Backus noted. Structured programming techniques — when they can be applied — have been "modestly successful" in overcoming the one-change-at-a-time approach of most languages, he added.

Von Neumann-oriented languages have "enormous frameworks" of fixed, overall rules on how they can be used. The semantics are closely coupled with the state of the data, and the changeable parts of the languages typically have little expressive power, the Levi-jacketed lecturer said.

APL is not word-at-a-time oriented — "and for that we owe a debt of gratitude to Kenneth Iverson" — but even this language considers the state of the data in terms of the von Neumann bottleneck, he pointed out.

Backus has definite ideas about the types of languages he'd like to see developed and brought into general use. There should be a variable-free programming style and, closely related to that, an algebra of programming that would be comparable to high school algebra in the way it extends our vision of the concept behind any given problem, he said.

"The average programmer needs a simple way of proving program correctness," Backus commented, adding, however, that he didn't mean proving correctness in the harshly abstract way many logicians envision.

Programmers just need an assurance they're on the right track, he said. The better languages should also provide a framework for application programming, he added.

In any case, continuing development of von Neumann languages is a poor investment, the IBM Fellow said.

Calendar

Nov. 17-18, New Orleans — **Automated Procedures for Engineering Consultants, Inc. (Apec) Annual Meeting.** Contact: Doris J. Wallace, Executive Director, Apec Executive Office, Suite M-15, Grant-Deneau Tower, Dayton, Ohio 45402.

Nov. 29-30, Washington, D.C. — **1977 National Systems Forum And Exhibit,** sponsored by Transportation Data . Coordinating Committee (TDCC) Contact: TDCC Headquarters, Suite 390, 1101 17th St., N.W., Washington, D.C. 20036.

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CW at ACM '77

Assigning Resources Seen Prime DDP Project

By Esther Surden
CW Staff

SEATTLE — The major challenge for a company adopting distributed processing is assigning resources with maximum effectiveness, according to George M. Crandell Jr. of McKinsey and Co., Inc. Speaking at the Association for Computing Machinery's ACM '77 in a session called Distributed Processing: A Challenge to DP Management, Crandell noted that systems' success is becoming increasingly dependent on their organizational and people aspects rather than the technical aspects.

Many problems can befall a company that goes into distributed processing without considering people and organization, he pointed out. Further, minicomputers have a way of proliferating and without a complete equipment inventory, management may not even know what systems its users have. This could increase overall DP expenditures, when distributed systems are supposed to cut costs down.

Ineffective or inconsistent application development, duplication of effort and loss of data control can also occur if responsibility is not distributed properly. In addition, computing resources may be "misused," since after the initial application is justified, the system begins to "look like a free resource and the desire to do a cost-benefit analysis goes down," he stated.

Management planning was extremely important to the success of the Missouri Pacific Railroad's implementation of a distributed system, according to Philip Seifert, manager of the minicomputer development effort for that company. Mopac's network carries 176,000 messages per day between 20 Digital Equipment Corp. minis, 63 Incoterm systems and an IBM 370/168. Another IBM 168 acts as backup, he noted.

The railroad has a plan it follows to assure smooth cutover of a new application system. As part of that plan, the distributed system is field tested to verify that the software is complete.

Next, some hands-on training and data base validation takes place. The system then runs while the implementation staff performs a comparison with the old system to assure it is ready for cutover. At the cutover stage, users take the place of the implementors.

Anticlimactic Event

If all the testing has been properly done, cutover should be anticlimactic, Seifert pointed out, but if it isn't performed thoroughly, cutover can be very traumatic. "Each step is of vital importance," he cautioned the group.

The company also tried a distributed approach to support, but found that it did not work. "We left an implementor at each site," he said, but this was not cost-effective and created more problems, because the implementors were on 24-hour call.

The support has evolved into a central group, which is the single interface for the users for procedural, hardware and software problems.

In an environment like that at Equitable Life Assurance Society of the U.S., control over a distributed systems capability that includes some 308 minicomputers is consolidated in a committee, according to John Gosden, vice-president of corporate services for that company.

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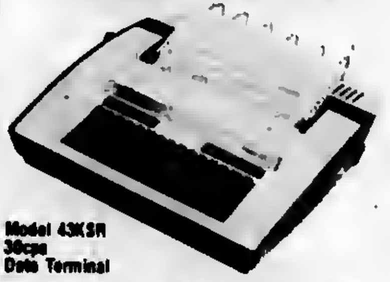

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MDS Mohawk Data Sciences

Software Design Methods Seen Useful to Most

By Don Leavitt
CW Staff

SEATTLE — Although there is disagreement about which of the current software design methodologies is best, almost any installation is better off using one than going without the structure it provides, panelists at an Association for Computing Machinery session agreed here last week.

Before they reached that general conclusion, they provided a large audience with detailed descriptions and insight into the effectiveness of four different methodologies and agreed that the approaches tended to complement more than compete with one another.

Carl Davis, representing the U.S. Army Ballistic Missile Defense Agency, outlined the Software Requirements Engineering Methodology (SREM) used by that organization to clarify software development needs.

SREM includes a requirements statement language, a documentation technique built around what Davis called R-Nets, and a requirements engineering and validation system. But that "first-generation" system suggests the need, among other things, for a formalized decomposition methodology and a language or family of languages focused on the needs and requirements of each phase of the development cycle, Davis noted.

CW at ACM '77

The Structured Analysis and Design Technique (SADT) devised by Doug Ross and others at Softech, Inc. was described by Clement L. McGowan, who said it utilizes a set of simple diagrams, each depicting a limited amount of detail.

It is, he said, a decomposition approach with conventions of notation that "correspond very closely to the subroutine call concept" of programming languages. Input enters each block from the left; output is described to the right; and control statements are "arrowed in" from the top. There is even an indication of where the next level of detail can be found, Davis said.

SADT disciplines and directs the designer's thinking while letting him see and explore various alternatives.

Ed Yourdon of Yourdon, Inc. reviewed how he devised and has since modified his concept of structured design work. He pointed out that a good methodology needs design theories, heuristics and strategies, along with implementation strategies.

He noted that all the approaches presented by the panelists had good points and issued a call for controlled experiments to see which of the methods really work well and to get away from "fuzzy quantification" of results. He reminded the crowd that one of the other speakers had claimed "15% improvement in productivity" and then said there is no way to know what that really means.

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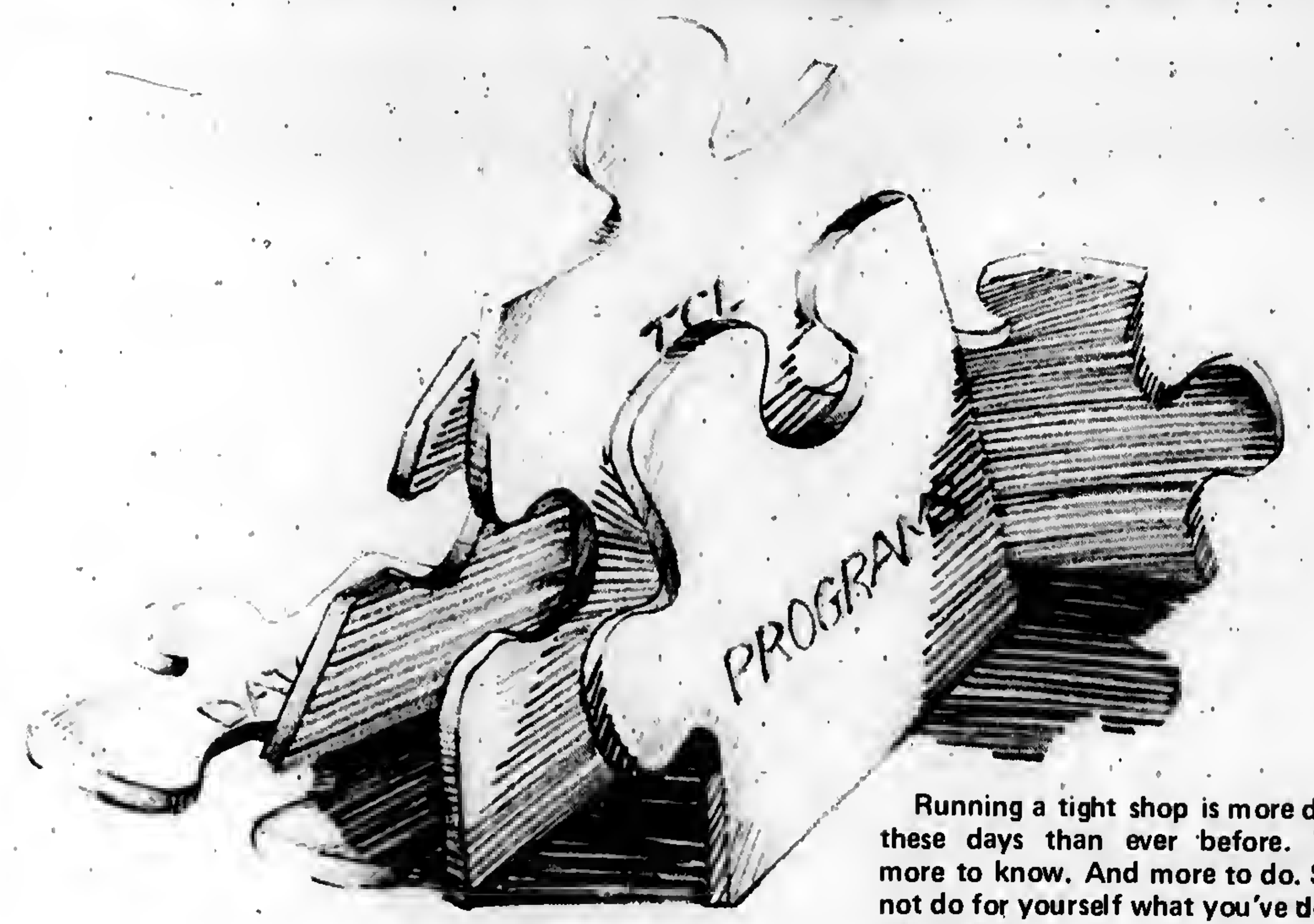

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Equity Urged In Services Tax

WHITEFIELD, N.H. — If the data processing services industry is "to be taxed at all, [it] should be taxed on an equitable, nondiscriminatory basis with all other industries and professions that also offer these types of services to their customers," according to Alan Rievman, chairman of the Association of Data Processing Service Organizations' (Adapso) Committee on Taxation.

Rievman, speaking at a meeting of the New England State Tax Officials Association, said the current system of taxation is unfair in that organizations that specialize in DP services may be taxed for a particular service whereas firms that offer the same service but are classified in another industry, such as accounting, are not taxed.

Rievman volunteered the assistance of Adapso in drafting new legislation needed in the areas of sales, property and, to a lesser extent, franchise taxes. "The laws, as they exist today, for the most part never contemplated computers or computer services and certainly not a specialized industry selling such services," he said.

Adapso seeks to include in the legislation the parameters of its industry, he said.

"The present piecemeal approach, as it is being applied by some states, will help no one. It will force literally hundreds of smaller computer services companies out of business in an era when they have the potential to increase their revenue and employment bases at a 10% to 20% rate annually," Rievman stated.

One element needed is an understanding of the underlying nature of processing being performed by computer, he said.

For instance, why is a general ledger that is prepared either manually or through the use of batch processing exempt from sales taxes whereas the same job performed using time-sharing techniques is subject to sales tax?

"... Somehow the transaction has changed, somehow some peculiar thing has occurred to transform this activity from a nontaxable one to a taxable one," Rievman said.

Rievman admitted that the industry itself has done little to explain the nature and processes of its business.

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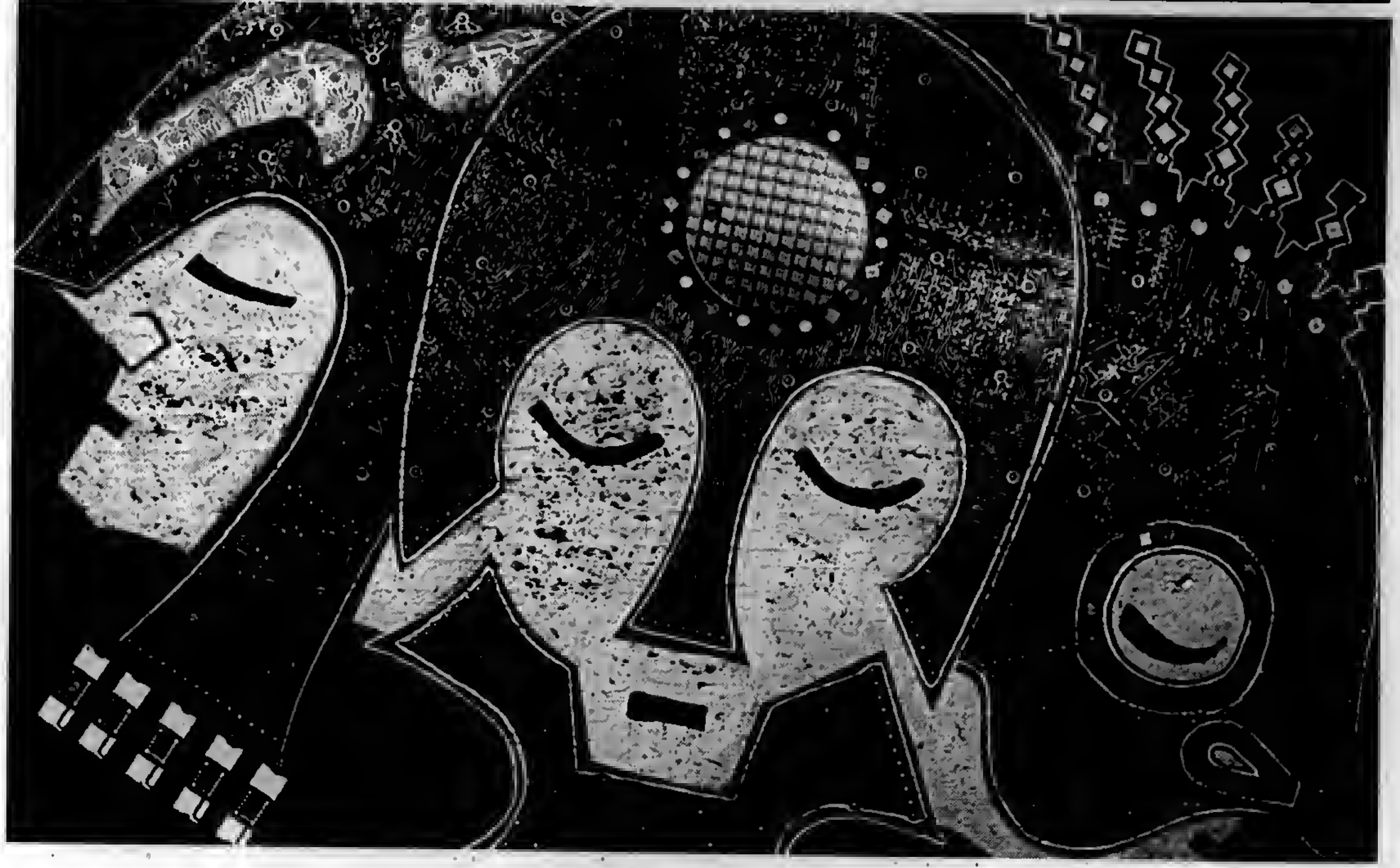


'Faces in the Stone'

Microcomponents Make Statements in Art

By Molly Upton
CW Staff

Microcomponents are the medium in this series of creations portraying man's relation to the world and how it has been affected by technology.

Artist Holly Sweeney expresses her design in integrated circuits and components on printed circuit (PC) boards assembled on wood. The components are selected for their "metamorphical implications" as well as for their decorative quality, she said.

These pieces were created as commissioned works for Semi, a trade association, to present to the inventors of the transistor, Nobel prize recipients Dr. John Bardeen, Dr. Walter Brattain and Dr. William Shockley.

In assembling her works, the artist often cuts up PC boards — rejected components obtained from friends in the industry. The silicon wafers are glued or sometimes secured with small brass nails adjacent to the edges. Occasionally the pieces must be drilled with a jeweler's drill.

The hardest part is integrating the parts smoothly with the overall graphic design so they become an inherent part of that design, she said.

The works pictured here are "fairly small" since they were intended for presentation, although Sweeney has done works as large as six feet, she said.

"Cernnunos" is an ancient Celtic diety who was lord of the animals, Sweeney said. He has horns, and the wheel of fire below him — in reality a brass rotor wheel — is a symbol of the universe.

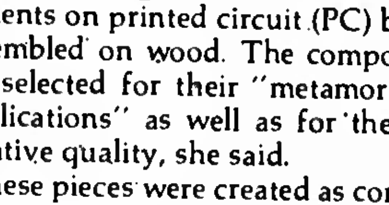
Advances in technology have changed man's relation to the earth and the balance of nature, as a result of which man has greater responsibility as a caretaker of the earth, she explained.

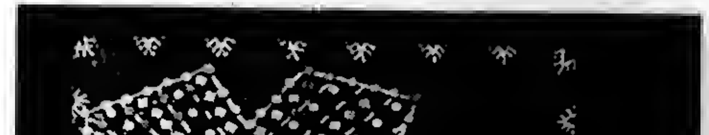
"Faces in the Stone" depicts militaristic figures, perhaps faces of war technology in the past. Often war has caused the advancement of technology, Sweeney said, and again man has more responsibility to control this technology.

In "The River Rider," man is riding, but also attempting to subdue, a silver trout, which was a magical animal in Celtic mythology. It's ambiguous who's winning, Sweeney said.

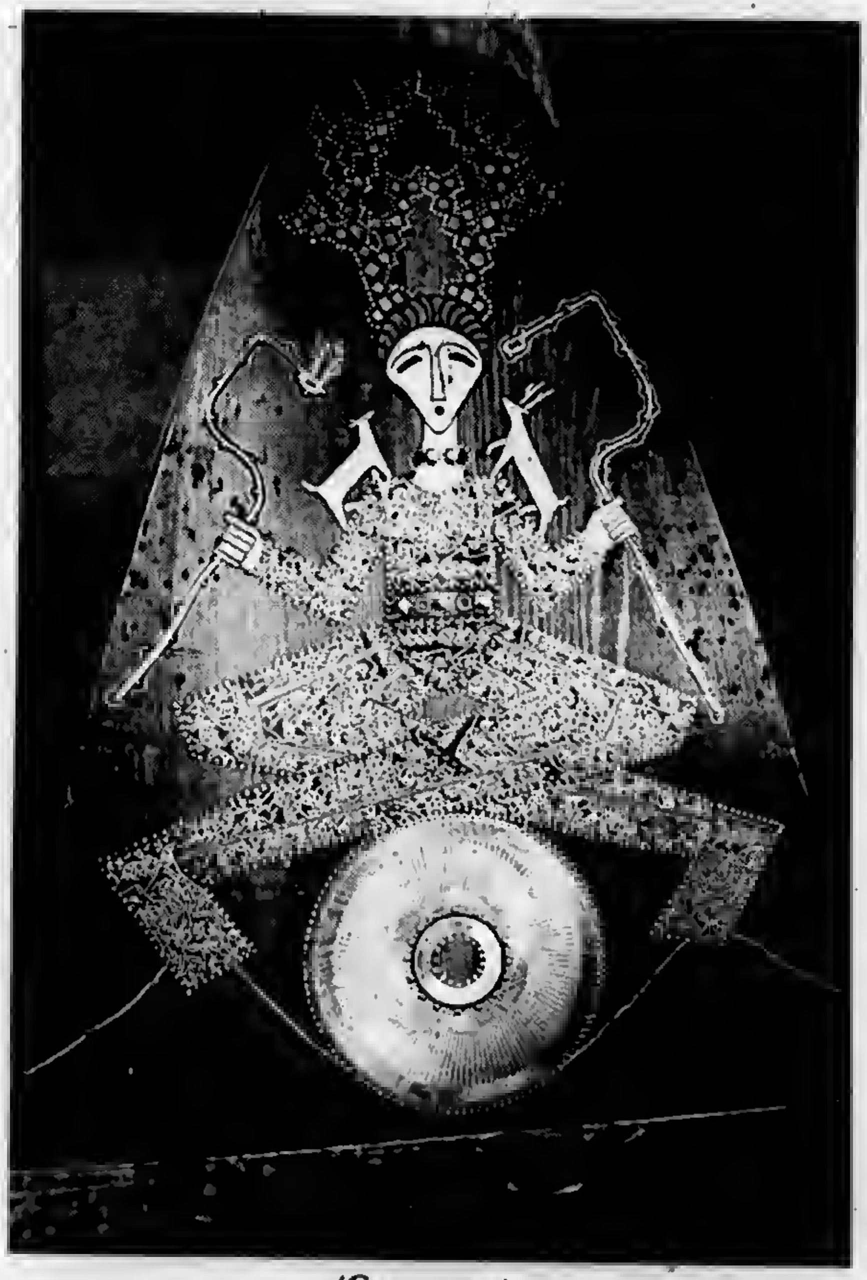
Sweeney's intrigue with the use of computer components and the spreading fame associated with these works has enabled her to become a full-time artist. She also works in other media, such as painting and collages.

New Masters





'The River Rider'



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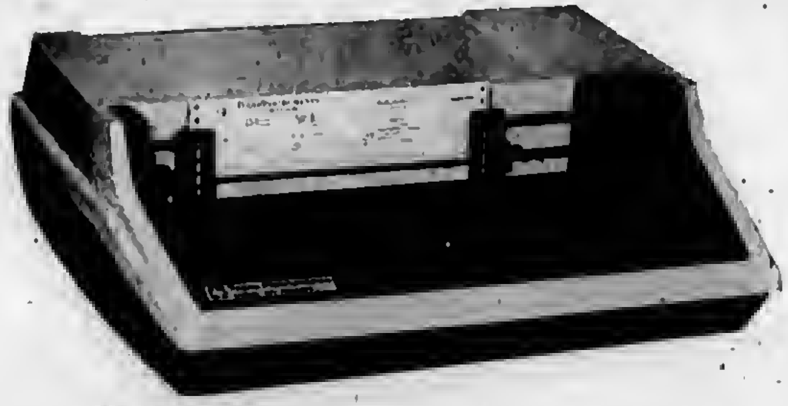
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Editorial

Apples and Oranges

The recent difficulties experienced by some analysts — and by Computer*world* — in positioning the new IBM 3031 and 3032 processors within the IBM line and against competition point to two problems within the industry.

First, there are no universally accepted measures for computer system performance.

Second, the announcements — and IBM's handling of them — show that IBM does not want users to be able to really compare comparable systems.

Second things first. In the announcements, IBM was careful to position the machines in a way that had more to do with that firm's legal problems than in a way that would be comprehensible to computer users.

IBM always tries to show it is giving increased performance for slightly increased prices. However, the 3031 and 3032 are actually giving users slightly increased performance for a lower price.

But because IBM does not want to be viewed as undercutting its present line — and the equipment of its competitors — this time it chose to compare the new systems with ones that are not truly in the same classification.

Therefore, the firm positioned the 3031 against the 370/148 when it should be compared more properly with the 370/158, and it placed the 3032 in competition with the 158 instead of its true competitor, the 168.

While the move fooled no one — assuredly to the regret of IBM — it did serve to confuse the way in which industry analysts rate the machines. And it was a disservice to the user community.

In the future IBM should not avoid the messy questions that arise from its price-cutting tactics. It should honestly position its machines against their competitors — certainly its salesmen in the field are selling the machines against their real competitors and not the paper competitors of the IBM press releases.

Fancy foot work, if not outright dissembling, will not fool many people. IBM should call a price cut for what it is — certainly its competitors and the legal watchdogs know it for what it is, even if the lawyers may have an easier time defending the move in court when it is not stated baldly.

The second part of the problem is more difficult to overcome. There are few people in the industry unbiased enough to establish a CPU rating system that makes sense and that would be accepted by all.

Those whose machines have very high execution rates scream for Mips ratings, while those with faster channels call for throughput measurements. No one is happy with the systems set up by others.

Obviously, no rating system will be perfect, but there is a crying need to establish some scheme that will be meaningful and fair at the same time.

We propose to do just that. Over the next few months we will be talking to industry analysts — both within companies and more independent ones — to try to find a system that will be usable.

We invite input from anyone — either in informal conversation or more formal communications. Get in touch.

Data Past

Five Years Ago
Oct. 25, 1972

NEW YORK — The Justice Department said it tentatively favored breaking up IBM into separate operating companies, each offering a complete line of computers, peripherals, software, maintenance and other services, and at the same time ensured IBM users they would receive support during the transition.

— — —

DETROIT — Burroughs Corp. introduced the L8000 series of minicomputers featuring "virtual memory" capabilities.

Eight Years Ago
Oct. 29, 1969

LOS ANGELES — Datastation Corp. filed suit against Service Bureau Corp. (SBC) for $1.2 million for an alleged violation of federal antitrust laws. Datastation charged SBC, an IBM subsidiary, with leasing IBM 7094 time at "unreasonably low" rates with the intention of damaging Datastation. SBC denied the charge.

— — —

WASHINGTON, D.C. — Congress initiated an investigation to probe complaints about computer billing systems. Citing reports of "harassing and even threatening letters ground out by computers," Rep. Dan Kuykendall (R-Tenn.) called for the House Committee on Interstate and Foreign Commerce to investigate not only collection practices, but also the practice of mailing out large blocks of unsolicited credit cards to prospective customers.

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Computerworld

Letters to the Editor

Price Impact on 370/158?

The article in the Oct. 10 issue concerning IBM's "30 Series" announcements was very comprehensive and well received. As manager of a large 370/145 shop, I have been exposed to normal IBM announcement propaganda, as well as countering announcements and speculation from Itel Corp.

However, one major question remains unanswered in my mind. That is, what is the expected impact on the used market price of the 370/158-1? I understand that there are thousands of these machines in use, with a high percentage purchased or owned by third parties. As you pointed out in your article, the power of this machine is only six points short of the 3031.

I now have a purchase quote from IBM of $1,000,000 for a 2M-byte 3031. Obviously, I would not pay more than that for a 158-1 or 158-3. I speculate that the 158-3 purchase price would find a level some amount less than the 3031 and 158-1 some $100,000 less.

I respectfully request that you speculate on this subject and suggest that it would be excellent material for a follow-up article.

You have my permision to print this letter, but I request that my name and company be kept confidential so that my strategic position with vendors is protected.

Unneeded Confusion

The IBM systems matrix headlined in the Oct. 10 issue is inaccurate and could be extremely misleading concerning the relative performance [and price/performance] of both the 370 and 30 series product lines.

The primary problem is the CPU power factors that were used. The International Data Corp. (IDC) ratings between the 158 and 168 are wrong and have been perpetuated by various performance rating systems which have used them as a base. Since the 30 series has been related to 370 performance, the whole picture has been distorted.

According to the IDC ratings, the 370/168 has 2.17 times the CPU power of the 370/158. This relationship should be approximately 2.9. Anyone expecting a 3032 to be 30%-50% faster than a 370/168 is going to be disappointed, and I would certainly hope to get more than a 25% performance improvement from the 3033 (over the 3032) if I am going to pay 50% more for the basic system. Not even IBM can rewrite economy of scale to that degree.

Both IDC and Computer*world* should go back to the drawing board.

S.S. Tyler
Mountain View, Calif.

Beware of Crumbling Plinths

In reference to Frank K. Binder ["DP Education Worthless in Everyday Use," CW, Oct. 3]: May he be rapped in the shin by a crumbling Byzantine plinth.

Diane Mayr
Salem, N.H.

Prison System Uses NCIC

Jerome Daunt's commentary on the worth of the FBI's National Crime Information Center (NCIC) [CW, Oct. 10] can be supported further.

The federal prison system uses the NCIC criminal history file to determine recidivism rates of inmates following their release from federal custody. Studies relate the prison environment to recidivism rates in an effort to weed out ineffective programs and replace them.

I agree with Daunt. "The NCIC works — let's keep it."

James W. Mullaney
Dunkirk, Md.

Motivation, Sex Equality Still DP Concerns

The Human Connection

By Jack Stone
Special to CW

"Motivation of DP People" was the subject of a talk I gave on the opening day of the Data Processing Management Association (DPMA) National Conference in D.C. earlier this month. I thought it might be useful to share some of the words I sounded on that occasion and then tell of a fine speech I heard on women in business. As is my wont during such presentations, I availed myself of the opportunity to corral some more data about the wild and wooly human denizens of the DP jungle.

I asked the assembled multitude (104 attendees, to be exact) six questions. The first related to size of installation, and nearly all were medium- or large-scale. The next five asked for a show of hands if the populace felt that the following groups were "motivated, dedicated, loyal, etc., managers and employees": top (non-DP) executives, users, analysts, programmers, operations personnel.

The executives came in at about 30%, which was higher than I expected. Then the numbers slipped downhill fast, converging on about 5% for operators, which allowed me to tee off with this comment:

"Let's look at the operations situation. "Isn't it a bit scary to know that your multimillion-dollar installation (to say nothing of the billions of dollars riding on it) is in the hands of a group of people you feel are not motivated to do the job? To me, at least, it is not only bizarre but fraught with unthinkable possibilities. What would happen to commercial aviation if 95% of the pilots were not properly motivated to do their job?

To "bottom-line it," as they say, my message was this: I believe that the reason for such a widespread lack of motivation (I'm drawing the conclusion because I've asked similar questions during numerous lectures and classes during recent months) is because management does not provide a professional environment — and all that this implies — to meet the real psychological needs of the staff. You see, physical and social needs of the average DPer are pretty well satisfied. But DPers require much, much more in terms of psychic income than they are currently getting. And I for one, think it's not too difficult to please them.

Let's take programmers, for example. I don't think they are asking for the moon when they request such special things as quiet, their own desk, an up-to-date Cobol manual and some decent machine time.

Oh, yes, I'm also including operations in the pie, because operators, you may be surprised to know, view themselves as professionals; after all, if you were an operator on third shift making corporate level decisions, you would feel rather important too, nicht wahr?

There must be 500 texts on how to build a better working environment, so I'll just conclude this part of the column by noting that DP people con be turned around. They are the major force for change in large organizations and they con change, contrary to what some people think. But the most important influence on carrying out such change lies in the conduct of the DP manager as perceived by the DP employee. Unless this perception is turned around, all efforts to induce a motivating climate are doomed to failure, guaranteed.

The speech on women in business was given by Ida Mason, professor of data processing at Lehigh Community College, who reported on the results from current research (including much of her own efforts during the last three years) on the progress made by women in the DP industry. (She has a neat knack of presenting material in a highly articulate, witty and deliberate style.) She told of increasing progress during recent years toward equalizing DP job opportunities among men and women.

For example, her data suggests that in the middle and lower levels of most DP organizations, women are nearly on a par with men for both management and technical jobs. (I should note that she referenced data and writings of some fellow named Jack Stone, who conducted a CW survey on women in DP last year).

During my interview with her after her talk, she went on to say that at the higher levels of the organization, women are still shut out because of what she termed "subtle" discrimination. "On balance, however, women are probably better off in DP than in other industries," she said.

She offered a three-point program for ending sex discrimination. "First, you must create a positive corporate environment. Search out qualified women managers and place them under supportive males. Second, resocialize the attitudes of the men. Put them into awareness training, which is best performed by male/female teams. Also, get men to socialize with women:

"Third, get women into management training particularly in dealing with healthy team work. Females lack confidence and therefore are their own worst enemies. Do you know that one major reason why there aren't more women managers across the country is because women don't assert themselves enough and push hard for those jobs."

Licensing, Certification Not Same Process

. . . And in This Corner

By Kenniston W. Lord Jr.
Special to CW

There are those who say both certification and licensing are solutions in search of problems. Some believe the two issues are indeed the same process; others think they are collaborative — that is, separate but associated.

Still others feel that neither is necessary and that those of us who have applied efforts in behalf of either or both are searching for windmills to tilt.

In this and the articles to follow, we will examine both as separate issues, asking the following questions:

- Is there really a problem for which certification and/or licensing can provide a solution?
- If such a problem exists, have licensing and certification properly addressed it and when might such a problem be resolved?
- If no problem exists, why have rational people attempted to provide remedies?
- Whether or not such a problem exists what progress is made, how has it been made and, where do its short- and long-term futures lie?

Before beginning, however, some attempt should be made to clarify the differences between licensing and certification beyond those of mere definition and to demonstrate how those differences can be complementary. It is apparent certification and licensing are a single issue in the minds of many.

In simple terms, certification is an attestation to the *capability* to perform some set of tasks, while licensing is an attestation to the sonction received to perform those tasks. Why such affirmations may be necessary is not the subject here, but will be dealt with in the following articles.

Certification, as originally envisioned by the founders of the Certificate in Data Processing (CDP) program, was contemplated as a means to measure *educational* accomplishment within the business data processing field.

Joe Rigo was exactly right when he said recent college graduates have more success than others in passing the examination, but totally incorrect when he said the test is one of useless facts and information.

Thus, for whatever reason one sits for the exam, he is paying for the right to demonstrate practical and academic accomplishment as a means of measurement among peers. To an extent, the satisfaction received is largely personal.

There is no great preponderance of evidence that CDP holders have been in singular demand in the job market. Thus, the raison d'etre for a person to have the CDP cetificate remains of one of the personal demonstration of accomplishment.

This is not to imply that a noncertified individual cannot perform as adequately as the certified individual.

As, the number of certificate holders increases, however, there is a rising consciousness of the rigors required to pass the CDP exam, and many CDP holders are finding themselves in positions of leverage. The encouragement to obtain the certificate is expanding, as evidenced in several corporate-supported CDP prepartion programs, notably Allstate Insurance.

The basic question which must finally be addressed will take the form of the following analogy: If you were a candidate for open-heart surgery, would you prefer to be operated upon by one who had demonstrated his knowledge of the processes separately from on-the-job training and performance skills he may have acquired?

There are certainly instances where one has received the training and can perform the work. Certainly, there are some doctors and surgeons who have learned from the books.

But given the choice, would you not be operated upon by one who has both? Certification, if it is nothing else, is a measurement of a person's ability to apply knowledge to a problem. It is assumed that if he has the knowledge, he also has the *ability* to apply that knowledge in the performance of the tasks.

Licensing, on the other hand, is a means of controlling who will actually perform the task once the *requisite knowledge has been demonstrated*.

The emphasis should not be lost. Demonstrated knowledge should preceed any "official" sanction to perform such tasks. Further, that sanction should be applied to only certain kinds of tasks.

What must tie the two concepts together is, on the one hand, a system of generally accepted practices for the people involved and, on the other, a system of mandatory systems standards for applications.

The logical question now becomes this: Are such standards for systems and people necessary, "socially desirable" or absolutely unnecessary?

If they are necessary, why are we not working toward them? If they are absolutely unnecessary, why does a 14-year-old certification effort continue to struggle for existence? And if they are only "socially desirable," are we not expending a tremendous effort with no perceivable objective?

If we can assume that all efforts in behalf of licensing and certification were undertaken as the rational actions of rational people, it therefore follows that someone sees something that others of our number do not see; the priorities may merely be confused. And that will be the topic of the next article in this sequence.

Alan Taylor is on vacation this week.

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Package Gives User Control of Dumps

By Don Leavitt
CW Staff

LOUISVILLE, Ky. — Like many other IBM installations, the data center for Blue Cross/Blue Shield/Delta Dental of Kentucky often found itself overwhelmed with the amount of output generated by an Abend.

With the hope of reducing the amount of output involved in a full-blown Abend dump and aiding in the analysis of the problem that caused the Abend, the center installed the Abend-Aid package from Tomark of Cleveland in September 1976.

After a year of use, the two prime objectives have been "more than met" by Abend-Aid, according to Emmett Simpson, the center's manager of data base support/software services.

Before the package was in place, the staff had Abend dumps requiring 75 printed pages. With the Tomark software, printed output has been reduced to an average of five pages per "dump," Simpson said.

"Very little of a full dump is actually used for problem determination," he added. "What is used is dependent on the type of Abend, and Abend-Aid will search only those control blocks necessary to solve the problem."

When Abend-Aid finds an exact reason for an Abend, that reason is printed, along with other pertinent data, on one page. Other pages are used for data file information, Simpson said, noting the explanation of the problem is so concise programmers seldom have to use manuals for interpretation.

Should the programmer require more information, however, Abend-Aid provides a reference to the most useful manual, he added.

In cases where Abend-Aid cannot determine the cause of an Abend, a full IBM dump is given. But this is preceded by a printout of the data management control blocks so the programmer still saves time, Simpson stated.

The user predetermines how Abend-Aid should handle each type of Abend code; this handling can be applied selectively so Abend-Aid processing is bypassed, for example, for certain jobs or programs.

Getting the package installed and keeping it up and running has been very easy, Simpson continued. Installation took "about four minutes elapsed clock time" on the center's 370/158, he recalled.

Since then, he said, the center encountered two problems when using the package, but they were solved over the phone. "In talking with Walt Thomas [at Tomark], the solution to both problems were found."

And "in both cases, the problem was our fault and not Abend-Aid's," he volunteered.

'Screen' Eases 'Environ/1' Chores

CINCINNATI — The ENV-Data software recently introduced by Cincom Systems, Inc. was described as an on-line application system which enables users of Cincom's Environ/1 teleprocessing monitor to collect data entered through IBM 3270-type terminals.

Included in the ENV-Data package, but also available separately, Screen is an on-line service routine that enables Environ/1 users to edit and validate input from those same terminals.

Data is captured under ENV-Data by "filling in the blanks" of user-defined screen formats and issuing an appropriate command. Erroneous fields are detected and highlighted by invoking the Screen utility, a Cincom spokesman added.

Edit criteria for validation of data entered at the CRT are defined by the Screen user in a batch program. The editing itself is performed interactively; all errors are typically displayed in high-intensity characters and the cursor is positioned at the first field in error, the spokesman explained.

During execution, Screen will right-justify with leading zeroes and align at a decimal point (if applicable) all numeric fields. It will insert a sign at the rightmost position, defaulting to "+," Cincom noted.

An asterisk will be placed in the first position of required fields when no entry is made by the CRT operator.

Editing capabilities of Screen include the conventional checks for alpha or numeric data and for ranges of acceptable values, both minimum and maximum. However, it also supports table lookup operations to determine the validity of such things as state codes in address fields, Cincom said.

User edits are also provided, allowing the user to add special edit functions, the spokesman added.

The ENV-Data and Screen programs require Cincom's Total data base management system and Environ/1. Those prerequisites can be acquired for $1,100/mo and ENV-Data (including Screen) costs an additional $275/mo plus $1,000 installation fee.

Purchase plans are available for all Cincom software, the company said from 2300 Montana Ave., Cincinnati, Ohio 45211.

'Update' Aids Burroughs Operations

HUNTINGTON BEACH, Calif. — The Update System from Commercial Business Applications (CBA) reduces the cost and enhances the operation of a middle- to large-scale Burroughs installation by improving the efficiency of program maintenance and the reliability of program documentation, according to a spokesman.

The package appears to be a source program library facility, similar in general purpose to several packages that have been available to the IBM-oriented user for some time. The Update System, for example, manages the storage and updating of card images on tape, disk or disk packs.

In addition to the expected add, change and delete functions, the user can create new modules through INCLUDE and COPY facilities, CBA said. The package also allows the user to trigger assembly, compilation or execution runs of the stored card image files.

When a user's module is initially constructed and entered in the Update System, a sequence number if assigned to each card image. That number identifies the card image in the same way that assigned names designate modules or groups of modules, called "volumes" in this system, the spokesman explained.

Update processing can be addressed to any of three levels: volume, module or card image, he noted.

Written largely in Cobol, the system requires 68K decimal words on a Burroughs mainframe and can be leased for $178/mo for a minimum three-month period. CBA is at 17511 Crown Circle, Huntington Beach, Calif. 92649.

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HIS Beefs Up Software for Its Level 6 Mini

WALTHAM, Mass. — Honeywell Information Systems, Inc. plans to introduce two versions of its Gcos 6 operating system and a series of Gcos 6 compatible software modules designed to enhance the capabilities of the company's Level 6 minicomputer.

The current Multi Dimensional Tasking (MDT) Gcos 6 is expected to be compatible with the Mod 400 release, available early next year, which HIS described as optimized for batch, data entry and communications processing. A Gcos 6 Mod 600 release, late next year, adds an advanced ring structure — like Multics, according to the firm — for large, secure multiuser systems.

Beyond that, the modular approach to the operating system support allows users to "mix and match" facilities in order to tailor the mini to their needs, a spokeswoman noted, adding that the modules will be made available in three phases.

Emphasis in the first two phases will be on providing greater multifunctional terminal capability under Level 6 Gcos: remote batch and data entry facilities that can be used concurrently with other modules under Gcos 6 will be available in the first quarter of 1978.

An enhanced Cobol compiler that produces reentrant code and an RPG compiler will be released in the first phase, the spokeswoman added. Other software will allow the Level 6 to emulate HIS' VIP 7700 terminal so the mini can communicate with most large-scale HIS CPUs. Linkage to non-HIS CPUs through IBM 2780-type binary synchronous protocol will be available at the same time, she said.

An initial implementation of High-Level Data Link Control (HDLC) support for the Level 6 will be offered with the remote batch software, she added.

Terminal Polling

In the third quarter — and the second phase of the planned releases — a terminal concentration facility will allow the Level 6 to poll VIP 7200s linked to it. At the same time, ties to non-HIS CPUs will be strengthened through IBM 3780-type "bisync" protocol support, the spokeswoman noted.

A "downline load" feature will allow users to develop programs on a large-scale CPU, then move them to the Level 6 mini for execution, she continued.

The third phase, in the fourth quarter of 1978, will include a full implementation of HDLC support and the compatible data base structures and software required to support an evolution to distributed systems.

Compatible versions of the Level 66 IDS-II data base management system and the Transaction Driven System (TDS) software will be offered for the Level 6. In addition, a Fortran cross-compiler is planned for the same timeframe, HIS noted.

A typical Mod 400 configuration, built around a 72K-word 6/34 and 10M-byte disk subsystem, might include Cobol, the data entry facility, the remote batch feature, HIS communication support and sort facilities. This software would carry a license fee of $9,165, the spokeswoman added.

A typical Mod 600 setup, with a 128K-word 6/43 and a newly announced 67M disk system, might be made up of the Cobol compiler, an assembler, TDS Level 6, IDS-II Level 6, Remote Terminal Concentration software; the HIS communications support and sort routines. This would cost users $39,015 in addition to the hardware rental, she noted.

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You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, New York 11797. (516) 575-3034. Telex: 96-1430. TWX: 510 221-1842.

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'APO' Adapted To MVS Sites

SUNNYVALE, Calif. — The need to minimize working sets and to reduce paging in virtual systems has resulted in Boole & Babbage Inc.'s introduction of a version of the Automatic Paging Optimizer (APO) for MVS users. Previously, the package was available for OS/VS1 and SVS sites only, a spokesman noted.

APO lets the MVS user measure and automatically restructure programs to maximize memory utilization. By doing this, the user improves throughput while reducing teleprocessing time and system overhead, he added.

The package measures programs in the production environment and produces statistical reports on paging activity and memory usage, by program. It also produces reports on inter-Csect reference patterns of programs to be optimized, then determines the optimal ordering of the module's Csects and creates a working set module.

APO for MVS is currently available for $9,600, Boole & Babbage said from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

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Initial WCS Application Backs Manufacturers

By Esther Surden
CW Staff

LOWELL, Mass. – The WCS/20 and WCS/30 small business systems announced recently by Wang Laboratories, Inc. [CW, Oct. 17] include a range of software that includes support for manufacturers.

The systems' operating system which runs in 16K to 32K bytes of memory, supports multiple CRTs running any number of jobs concurrently. Using the virtual memory technique, the system allows each user at a CRT to "see" 1M byte of memory, the firm said.

A data management software program enables the systems to handle sequential and indexed files. A third access mode allows a program to switch between sequential and random access on the same file, the company stated.

In addition to Ansi Cobol, the systems run RPG-II, which Wang said is compatible with the RPG-II on the IBM 3. Other languages available are Basic, an assembler language and a "procedure" language.

A data entry/file maintenance utility, interactive text editor and symbolic debug facility are also provided.

In addition, Wang introduced an integrated inventory control and bill of materials processor package. The Manufacturing Management System (MMS) "provides multilevel product explosions and implosions from raw materials to finished goods."

MMS can produce lead time figures for ordering inventory items. The processor also provides updating of parts and subassemblies so that as a component's price increases, every product using that unit is updated.

The system checks inventory on hand against minimum reorder levels selected by the user.

The operating system plus support for the Assembler and one other language – at the user's choice – is bundled into the cost of the hardware.

Additional language processors cost $3,000 each.

The MMS application software distributed on floppy disk costs $3,000. With an accounting module added, the "floppy" version goes up to $6,000.

Distributed on hard disk, the base MMS and the accounting module cost $7,500, Wang said from One Industrial Ave., Lowell, Mass. 01851.

Atsu Shows Nets' Access

BOULDER, Colo. – A 92-page directory showing which remote computing companies offer services in each of 79 metropolitan areas in the U.S. and Canada has been compiled by the Association of Time-Sharing Users (Atsu) as a service to its users and as a product for sale to others.

The 92-page "Geographic Directory" lists companies offering local telephone lines for toll-free access to their services in each area. It also shows what line speeds are supported, whether remote batch terminals can be used and how many, if any, vendor personnel are available in local offices within each area.

The directory is part of a three-volume set of reference reports that have been published by Atsu. The ring-bound documentation is updated monthly and is distributed free to Atsu's 12,000 members, a spokesman said.

"The "Geographic Directory" is available separately to nonmembers for $15 prepaid, he added from the association offices at 75 Manhattan Drive, Boulder Colo. 80303.

Package Gathers SMF I/O Files

KANSAS CITY, Mo. – The SMF-Type6 package from Joseph M. Joyce & Associates supports IBM OS and OS/VS users by accumulating EXCPs (for print lines, cards punched, etc.) for nine of the 36 Sysout classes for all jobs in an SMF file, using the Type 6 SMF record, according to Joyce.

The file may cover a week, a month or any other period of SMF history. The package will list the number of times each job name has run, the number of EXCPs for each of the nine Sysout classes and the number of EXCPs for all other classes, as well as total EXCPs, a spokesman said.

The data reduction handled by SMF-Type6 is controlled by a title card for headings and a selector card for the nine Sysout classes. The program costs $200 and will be shipped within 24 hours of receipt of a signed agreement and a copy of the data control block (DCB) for the user's SMF record.

Joyce & Associates is at 5925 Rockhill Road, Kansas City, Mo. 64110.

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Terminals can be configured to scan bar codes and magnetic stripes or accommodate other peripherals through RS232 ports. Display options include additional numeric displays, up to 15 LEDs for prompting and a 32-character alpha/numeric display. Serial asynchronous or synchronous communications ports with either RS232 or line driver I/O and a low speed modem may be added. Parallel communications ports are also available. Both PROM and RAM memories are expandable.

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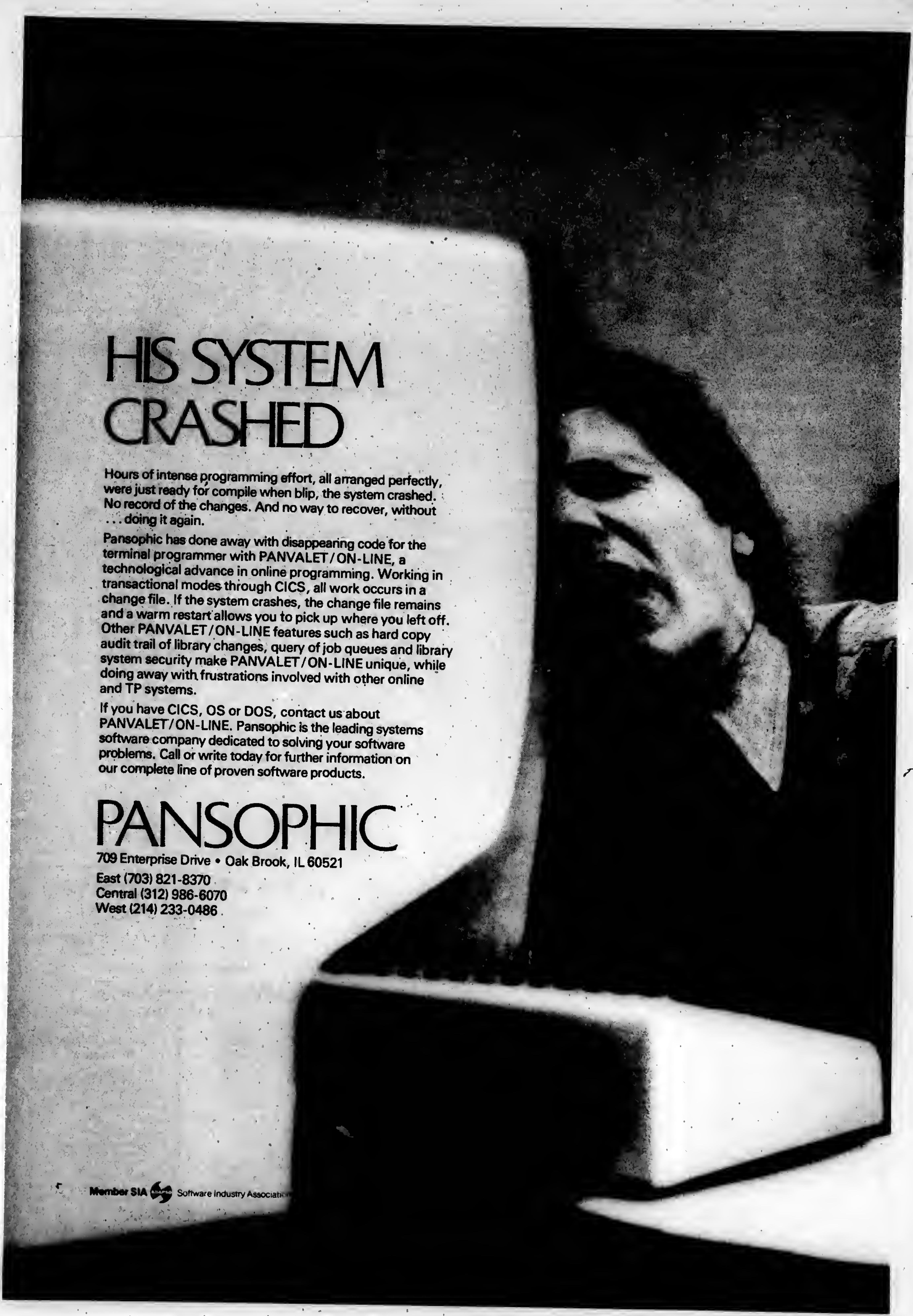

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User Finds Audit Ensures Better Sort Handling

By Donald L. McGinnis
Special to CW

SAN RAFAEL, Calif. — For the past three and a half years, the data center for Fireman's Fund Insurance Co. has been using Syncsort from Whitlow Computer Systems, Inc. to run its sorting. Recently the company acquired another software package, Sortaudit, to implement efficiency improvements in that part of its workload.

Sortaudit, marketed by Whitlow to augment Syncsort, is used to profile sorting activity for general analysis. It also identifies specific inefficient sorts for optimization.

During the first month of using Sortaudit, Fireman's discovered 90 large sorts running inefficiently. After optimization, we saved over $45,000 in annual processing costs on these sorts.

Most of the improvements were made by increasing the amount of main core storage given to the large sorts, reducing their work I/O significantly.

To assist the user in analyzing his sorting activity, Sortaudit produces summary, grid and detail reports from data written on the Systems Management Facilities (SMF) file by each execution of Syncsort.

The summary report identifies total resources used for sorting with six sets of summarized data. The grid report shows the effects on resource usage when the amount of sort core used is varied against file size.

The detail report contains data on each Syncsort execution, selected and formatted by user-entered control statements.

Sortaudit also supports a user exit facility to allow additional processing of sort execution data.

With Sortaudit summary and grid reports, we can measure the "vital signs" of our sort workload. This is useful in our shop, where about 25% of the computer workload is sorting. We can identify where our optimization effort should be spent and how successful the improvements are.

As an example, the grid reports show work I/O counts per megabyte of data sorted (on a matrix of file size by amount of core used for sorting). Our goal is to lower the work I/Os per megabyte. Periodic Sortaudit reports demonstrate our progress.

Overallocating Sorts

It was found that 92% of our sorts overallocated disk work space while 90% skipped the merge phase completely. Moreover, 4% of our sorts caused 90% of the sort work I/O.

Based on these and other facts we are now exploring general changes including reducing core for small sorts, increasing core for large sorts (dynamically based on paging activity), reducing excess overallocation on all sorts, reconfiguring sort work devices and relocating Syncsort load modules.

We have developed a user exit to augment Sortaudit, using the interface provided with the package. Based on actual statistics of each Syncsort execution, our exit routine calculates the recommended amount of disk work space to be used (by our standards), the amount of disk work space over- or underallocated and the work I/Os (testing, production, etc.). This information can then be shown on detail reports when requested.

Also, we created a file of the Syncsort accounting records so SMF files need not be read for subsequent processing.

McGinnis is manager of the performance and application support unit at Fireman's Fund.

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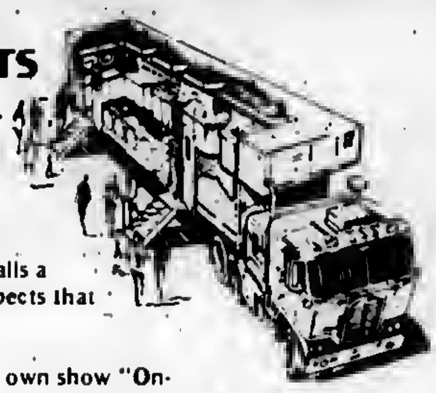

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UCC Boosts CDC Gear

DALLAS — University Computing Co. (UCC) has added a second Control Data Corp. 6600 to its computing center here. It has also converted from Scope to the latest version of Network Operating System/Batch Environment (NOS/BE) software.

UCC's dual 6600 complex is front-ended by two Cope communications controllers that support batch terminals operating in UCC Cope mode, CDC UT200 and IBM Hasp multileaving simulator modes.

UCC's computing facilities, in addition to its CDC 6600 mainframes, consist of multiple coupled Univac 1108/Fasbac systems and 1108 Exec 8 systems.

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For International Nets

CCITT Data Sets Among Show Debuts

By Ronald A. Frank
CW Staff

ATLANTA — Data sets compatible with the standards used by international data communications networks were among a range of products introduced by suppliers at the first International Telecommunications Exposition (Intelcom 77) here recently.

General Datacomm Industries, Inc. of Wilton, Conn., introduced its GDC 2400ES, a CCITT-compatible modem that transmits and receives synchronous binary serial data at either 1,200- or 2,400 bit/sec over both dial-up and private lines.

Charles Johnson, General Datacomm president, shows firm's CCITT data set.

An auto-answer feature is included in the modem that automatically connects the unit to the line when a ring signal is detected. The GDC 2400ES can be used in two-wire half-duplex and four-wire full-duplex applications in both multipoint and point-to-point modes, a spokesman noted.

Auto-dial backup and an optional two-channel multiplexer are available with the data set. The device, which complies with CCITT recommendations V.23, V.24, V.26 and V.28, costs about $2,000 for a basic configuration, the spokesman said.

CW at Intelcom 77

Racal Milgo showed its Modem 26 which operates at 1,200- and 2,400 bit/sec over voice-grade lines and complies with CCITT recommendations V.24 and V.26. The data set features dial backup and has both local and remote diagnostics for operation on multipoint and point-to-point nets.

The basic unit costs about $1,500 from the firm at 8600 N.W. 41st St., Miami, Fla. 33166.

Codex Corp. of Newton, Mass., showed a line of CCITT-type data sets compatible with the V.21, V.23 and V.26 recommendations.

CW Photos by R. Frank

Extel Corp. demonstrated intelligent teleprinter for TWX and Dataphone uses.

The units, which operate at 300-, 1,200- and 2,400 bit/sec, feature dial-up, private-line and secondary channel capabilities. Prices range from $535 for the V.21 private-line unit to $1,310 for the V.26 device with secondary channel.

The CCITT units were quoted at U.S F.O.B. prices because of the variety of additional local costs that vary from country to country, vendors at the Intelcom 77 show said.

In the teleprinter area, Extel Corp. of Northbrook, Ill., introduced its Model B308SWL, a programmable-memory automatic send/receive (ASR) unit that operates at speeds up to 30 char./sec for TWX and Dataphone applications.

The microprocessor-based unit handles three Ascii character sets and includes a standard RS-232 interface. With a 4K memory, the teleprinter costs $2,860 or $100/mo; an 8K memory model costs $3,160 or $110/mo on a one-year lease.

As for data sets geared for U.S. use, Gandalf Data, Inc., of Wheeling, Ill., showed two limited-distance data sets that operate over local wire connections.

The LDS 121 operates at all speeds of "asynchronous data transmission up to 9,600 bit/sec" on four-wire full-duplex and two-wire half-duplex facilities, the company said.

The card-type modem costs about $135 per channel. Over 26-gauge wire at 9,600 bit/-

(Continued on Page 33)

Datagram Link to Packet Nets Urged to Extend User Control

By Ronald A. Frank
CW Staff

ATLANTA — The development of a datagram interface for packet-switched networks will provide users with a more efficient method of operating on packet nets, according to Walter Elden of the NCR Corp.

In remarks presented at a session here on public data networks during the recent International Telecommunications Exposition (Intelcom 77), Elden described efforts now under way within U.S. standards groups to implement a datagram interface as part of the X.25 protocol standard adopted by the Consultative Committee on International Telephone and Telegraph (CCITT) last year.

The X.25 standard primarily utilizes the virtual circuit form of data terminal interface under which control is maintained by the carrier. Under the datagram method of packet transmission, an end-to-end user protocol is established "which implies that the user is in control of both ends of the data path," Elden explained.

Datagrams have been described by Louis Pouzin, director of the French Cyclades packet network, as "a very simple transport facility" that can be utilized as an "underlayer" of a virtual circuit protocol such as the X.25 standard.

As seen by the user, the Datagram method gives greater flexibility in the use of a packet

(Continued on Page 34)

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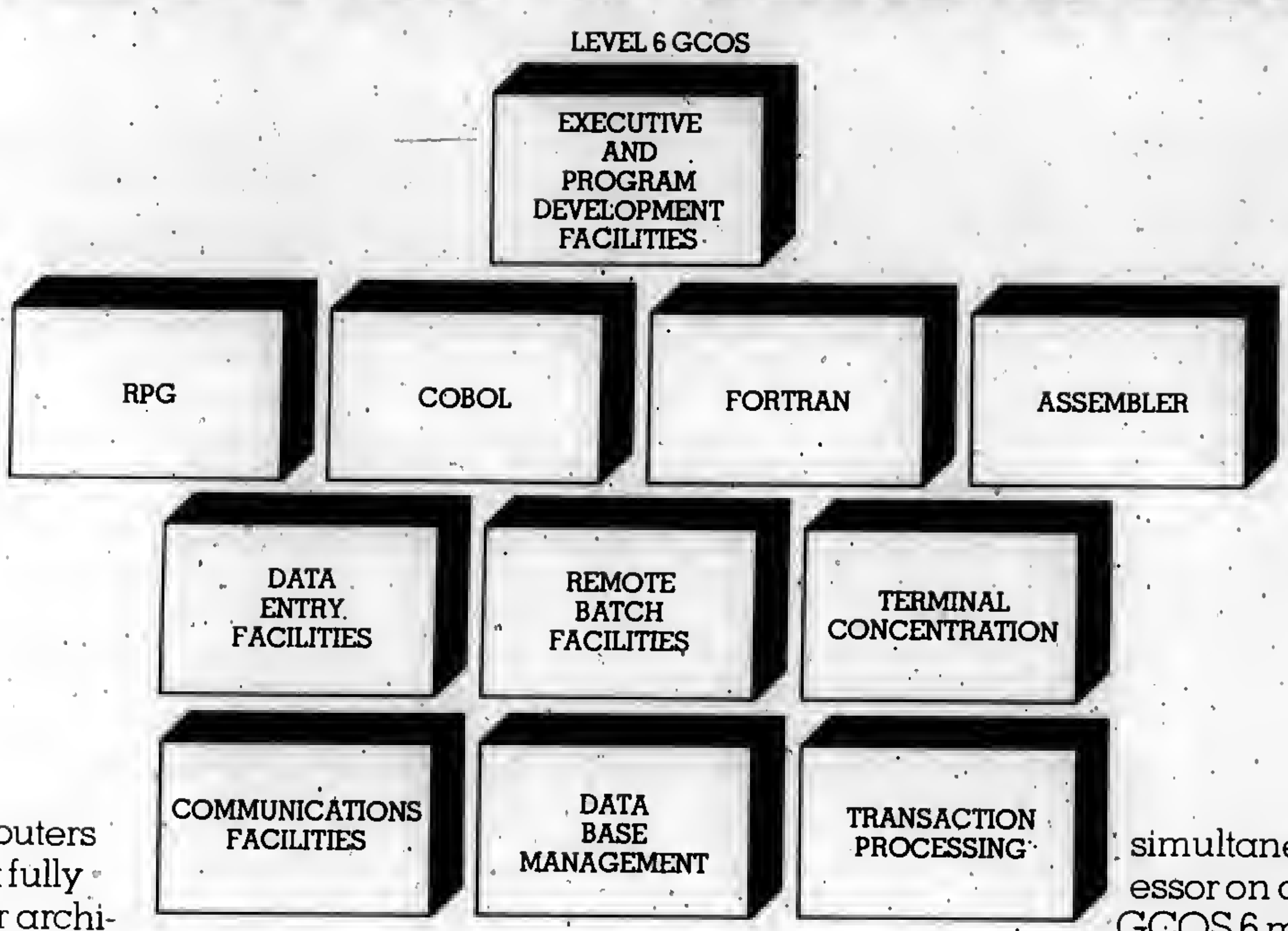

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CW at Intelcom 77

International Differences Seen Threat to Private Lines

By Ronald A. Frank
CW Staff

CW Photo by R. Frank

Luis Terol

ATLANTA – Regulatory disputes now going on between transatlantic telecommunications administrations could eliminate today's private-line facilities, according to Brendan McShane, a telecommunications specialist with General Electric.

Speaking at an International Telecommunications Exposition (Intelcom 77) session dealing with international specialized common carriers, McShane warned that future regulatory decisions "could completely change the rules of the game" for international network users.

Other speakers appearing at the session represented various types of carriers. Stuart Mathison of Telenet described the cost advantages of operating on a packet network for overseas data communications applications. Packet transmission can cost about $50/hour compared with $150/hour for Telex service and $108/hour for international data phone facilities, he said.

But Luis Terol of CTNE, the Spanish Telecommunications authority, said there is a reluctance on the part of European countries to interface with new carriers such as Telenet unless they go through facilities provided by existing international record carriers (IRC).

"A multiplicity of carriers will complicate the technical operations and administration" of overseas networks, Terol told the attendees.

The CTNE packet network began in 1973 with 177 terminals and today has about 4,700 terminals connected, Terol said. It is now being modified so it will be able to interface with other X.25-type packet nets by 1978, he said.

Howard White of ITT World Communications took issue with Federal Communications Commission decisions which he said gave firms like Telenet and Tymnet an advantage over the IRCs. If these new carriers operate directly from many U.S. cities to overseas points, then the IRCs should no longer be restricted to operating only through certain gateway cities in this country, he said.

Robert Conn of Western Union International said Datel service should be changed so the IRCs can provide alternate voice and data instead of data only. He agreed that the IRCs should be allowed to get away from gateway restrictions so they can operate directly into "hinterland" cities in the U.S.

If users want freer entry with more competition, White said, then they must be prepared for freer elimination of less profitable services by existing international carriers. New carriers will lead to higher costs for less heavily used services provided by the existing IRCs, he warned.

CCITT Data Sets Debut

(Continued from Page 31)

sec, the data set will transmit up to five miles, the firm said.

The Gandalf RM 3309 was designed for networks running at speeds up to 19.2 bit/sec and "is guaranteed to transmit a distance of eight miles" over 26-gauge wire. The card-type modem costs less than $600, the company said.

Gandalf also introduced its TTS 400 transmission test set, which it described as an installation and maintenance aid with both asynchronous and synchronous equipment. It costs $785 and provides the user with a variety of diagnostic indications.

In the communications controller category, Digital Communications Corp., Gaithersburg, Md., showed its CP-9000 communications processor which includes multiple microprocessors and can be used as a concentrator, multiplexer, front end or packet switch.

The modular system can support up to 480 lines in a private-line network with each microprocessor line-processing unit handling up to eight lines.

The system supports CCITT X.25, synchronous Data Link Control (SDLC) and Binary Synchronous Communications protocols and includes diagnostic features.

A typical system with 64K of memory, 12 channels with eight asynchronous low-speed ports and four synchronous medium-speed ports costs $20,000 to $25,000 depending on options.

Timeplex, Inc., Hackensack, N.J., showed its Model B101 bit-interleaved time-division multiplexer that complies with CCITT recommendation R101B.

Designed for Telex and data networks, the multiplexer can handle up to 96 channels and provides automatic fallback to redundant common control, the company said.

A typical Telex application handling 46 channels costs about $12,000.

Digital Communications Associates, Inc. of Norcross, Ga., showed its Smart/Network which the vendor said can handle geographically dispersed asynchronous data terminals while maintaining error-free transmission and compatibility with "all common computers and terminal types."

Users' Report...

"Winning Proposal" Winning Big

A step-by-step guide to proposal preparation is now helping many computer/EDP firms score big wins in their proposal efforts. Users of the book, entitled *How to Create a Winning Proposal*, report an impressive 42% average increase in the success-ratio of their proposal projects. Of the companies polled, 68% attributed their successful track record to the guidelines provided in the book.

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Microwaves Sept. 1976

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Copies of *How to Create a Winning Proposal* are available pre-paid from Mercury Communications, Inc. 730-G Mission St., Santa Cruz, CA 95060. $65 includes 3-5 day delivery inside the U.S. In California add $3.90 tax. For outside the U.S., $76 (int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

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Tymnet Cuts Packet Prices After Gaining Tariff OK

CUPERTINO, Calif. — The Federal Communications Commission (FCC) has approved revisions to Tymnet, Inc.'s Tariff No. 1. The approval resulted in reduced prices for users of Tymnet's public packet network services, the carrier said from its headquarters here.

The revisions, effective immediately, match prices for network interface equipment more closely to users' actual requirements as measured by the number of terminals requiring simultaneous support, the firm said.

The major effect is on the 1,200-bit/-sec service offered by Tymnet. Currently all users of this service incur a monthly charge of $2,750 for interface equipment which can support up to 62 simultaneous terminal users. Many 1,200-bit/sec users, however, have requirements which do not approach this 62-terminal level, a spokesman noted.

For up to eight terminals meeting simultaneous support, the price is now $1,250; for up to 16 terminals, $1,750; and for up to 30 terminals, the price is $2,450. The 62-terminal capability price is unchanged.

Also included in the revised tariff is a new option for users of the 110- to 300 bit/sec Tymnet service, currently offered at increments of up to 8, 30 and 62 terminals. The option is for users needing support for a terminal population of up to 16 terminals at a monthly price of $1,500.

Tymnet also announced another service which reportedly allows users of synchronous host interfaces to the Tymnet public packet network to have an economic backup line. An optional service, it is priced at $250 more than the cost of single-access line service, plus Tymnet's actual cost of providing the line.

Tymnet services interface customer host computers to customer terminals at more than 110 locations in the U.S. and the carrier has reached agreements "with all major international record carriers" which expand access to the network from more than a dozen business centers overseas, the company said.

Direct-Dial Data Station Runs at 2,400 Bit/Sec

MIAMI — A high-speed direct-dial data station, the 40+TK1 from ICC/Milgo, can reportedly cut costs and improve operator efficiency in a variety of corporate communications systems.

The 40+TK1, which stores messages in an MOS solid-state buffer rather than on paper tape or magnetic tapes, was designed to replace low-speed, leased-line and tape-operated terminals. It is suitable for use in systems designed for message handling, reservations, invoicing, order entry and similar functions, the company said.

Data transmission speed of the 40+TK1 can range from 1,200- to 2,400 bit/sec. Operation is over dial-up lines.

Since all data communications functions in the data station are fully automatic operators are given time to concentrate on preparing messages, according to a spokesman. Messages can be entered while the control module is actively communicating with the central site.

The 40+TK1 data station includes an ICC 40+ data display system, keyboard and control modules. It also includes a communications control module and buffer, a 110 char./sec printer and desk.

The terminal costs $14,500 or $295/mo with maintenance on a five-year lease. ICC/Milgo is at 8600 N.W. 41st St., Miami, Fla. 33166.

Elden Urges Datagram Packet Interface

(Continued from Page 31)

net. Datagrams, which can be transferred between the network and the user's terminal, can be handled independently of each other by the network with minimum delay and may arrive in a different order than the one in which they entered the net, Elden said.

If a network addressee cannot be reached on the network, the datagram will be returned to the sender with the appropriate code in the header. In addition, a user terminal may request the network to prevent another address from sending Datagrams to that terminal, he noted.

According to Elden, work toward the formation of a Datagram standard is proceeding the American National Standards Institute (Ansi) group X3S37, which is Task Group 7 of the Ansi X3S3 standards group. X3S37 is charged with public data network standards formulation.

The work of the Ansi task force has resulted in a document entitled "Generic Requirements for Datagram Service," which has been presented to the International Standards Organization (ISO).

The ISO document states that "the U.S. is of the belief that there are user applications wherein a more cost-effective service, based upon the datagram type of packet switching, can be achieved, as compared with virtual circuit packet switching (X.25)."

User's applications for packet nets exhibit the need for a simple data transport type of service wherein fast transport times, short messages and simple functionality of the data terminal and the network are needed, the ISO document said.

Virtual circuit service is not as efficient as datagram service for these types of applications and that is why a datagram standard should be developed, the U.S. position paper said. The applications that will benefit from a datagram type of packet operation are terminal-to-terminal operations and inquiry/response communications.

Increased support will be needed if international standards bodies such as ISO and CCITT undertake a real effort at developing a datagram standard, Elden said. "Since CCITT members are the carriers which would actually provide the service, datagram standardization will be further delayed, until either the carriers or the users express greater need for this new, potentially economic service," he said.

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The microprocessor controlled AJ 730 is much more than a cassette recorder.

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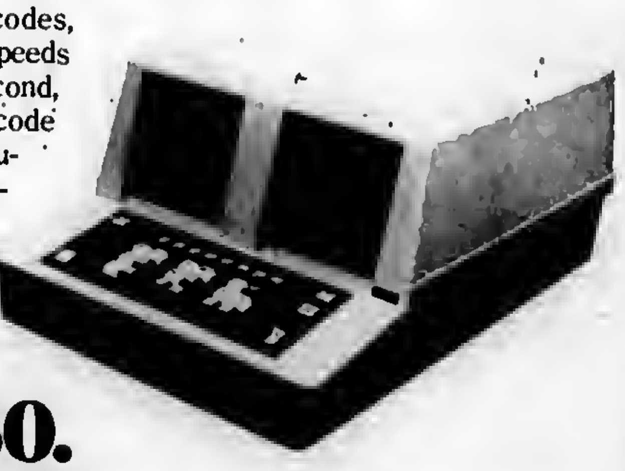

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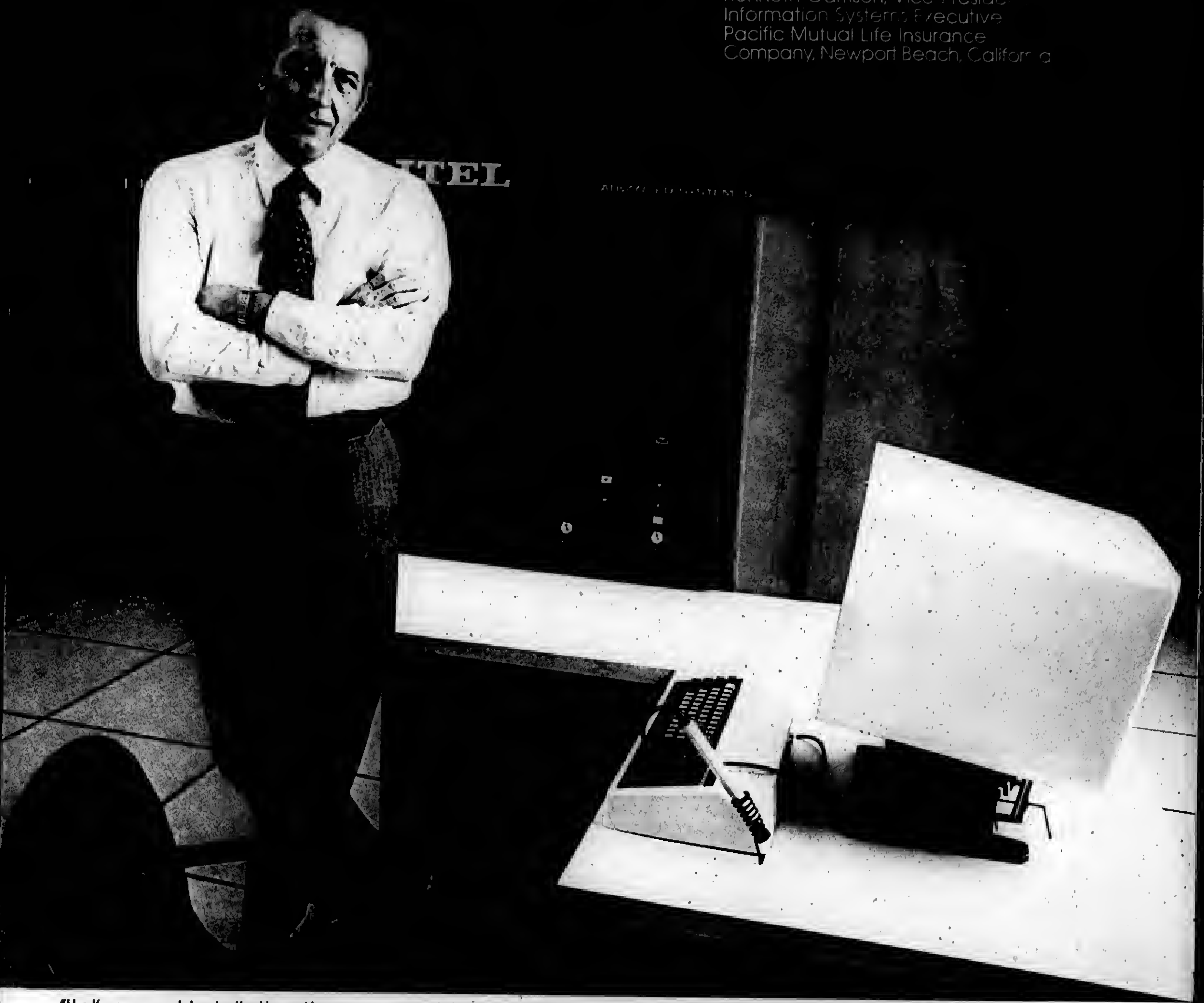

"Itel's record installation time was outstanding, especially when ours was the very first Advanced System to be installed. And its performance has proven to be as impressive as its installation.

"With more than $1.7 billion in assests to manage, you can imagine the variety of complex tasks to which we put our EDP equipment. Of course, we knew we could expect performance from the system. Before replacing our IBM 370/155 with Itel's AS-5, we conducted extensive pre-installation tests to determine compatibility, reliability and error correction capabilities of the Advanced System. And all tasks were completed in equal or faster time compared to IBM's 370/158.

"Also contributing to our decision was the fact that the Advanced System would protect our investment in programming, documentation and personnel training. So, not only did we save on initial cost, but we're saving money in the long run, too.

"Choosing the AS-5 was a good move—we've been thoroughly pleased with the Advanced System and with Itel every step of the way. We sincerely feel that Itel deserves every accolade possible for the quality and reliability of their Advanced System, and the quality and professionalism of their people."

"Incredibly enough, we made no software changes at all when we put the Itel Advanced System™ into production."

Dr. Clair G. Maple, Director, Computation Center, Iowa State University of Science and Technology, Ames, Iowa

"We're thoroughly pleased with the AS-5. Installation was completed with remarkable speed, and its performance has been outstanding. We're quite proud that Iowa State is the site of Itel's second Advanced System installation.

"We were initially receptive to the AS-5 because there seemed to be economic advantages involved. We saw the opportunity to replace the IBM 370/158 and to increase memory size, add secondary storage, upgrade our magnetic tape system and modify the CPU to a model III, all within a price range we could afford. And to be able to do all that without software modifications and without utilizing more space is positively remarkable.

"Here at the university, our Advanced System has between fifteen and twenty thousand users. It handles a wide range of activities – from course-related student programs to university-generated academic research. And its performance has been very impressive.

"In fact, we've been very favorably impressed in all areas of contact with Itel – from the outstanding performance of their products to the professional standards of their personnel and the excellence of the service they've given us."

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Telemax Cuts Phone Bills

VIENNA, Va — A computerized telecommunications service from TDX Systems, Inc. promises savings for smaller business offices with monthly long-distance telephone charges above $3,000, the company claimed.

The Telemax II Telephone Management and Control System will reportedly save a user up to 30% of annual phone charges. TDX is guaranteeing a minimum savings of 10%, over and above the cost of its service, a spokesman said.

A Telemax II user is linked by tie line to a microcomputer located at an office of Southern Pacific Communications Corp. (SP.), a specialized common carrier. In turn, the SP office is linked by data circuit to a TDX Interdata 7/32 host CPU in Virginia.

A long-distance telephone call for the user's office is routed through his own Wats lines as well as over SP's network.

At the end of each month, the user receives from TDX a detailed call report.

Typical charges for a user with four phone lines is about $500/mo while a user with eight phone lines would pay about $1,250/mo. Exact monthly costs of the Telemax II service depend on the user's telephone traffice volume.

Prices include support and maintenance, TDX noted from 1920 Aline Ave., Vienna, Va., 22180.

Software Emulator Allows Syfa to Enter 3270 Nets

IRVINE, Calif. — A software emulator that permits multifunction Syfa network processing systems to be used in remote IBM 3270 networks has been announced by Computer Automation, Inc.

The 3270 emulation capability reportedly enables a Syfa information station operator to switch between 3270 mode and regular Syfa mode at any time. In 3270 mode, the Syfa station appears to an IBM mainframe to be a standard 3270 family CRT terminal, the firm said.

Networks presently utilizing 3270 terminals can now use Syfa for concurrent data entry operations, local processing and batch communications while still retaining concurrent 3270 interactive communications capabilities, according to a spokesman.

Switching is executed by the appropriate Syfa Business-Oriented Language Sybol program, which causes temporary suspension of the active program. Control of the Syfa station passes to the 3270 emulation software, which alerts the mainframe it is ready for the polling sequence and performance of standard 3270 operations.

By striking a control key, the emulator software relinquishes control of the information station, posts its status as off-line and returns the terminal to Syfa mode, the firm said.

A separate program written in Sybol can additionally use the 3270 emulator to send batch remote job entry type of inquiries to the mainframe and receive appropriate replies.

This facility, which requires "minor modification to IBM applications software," enables the user to transmit and receive unformatted batch data intermingled with interactive 3270 communications, the spokesman said.

The 3270 emulation software is available for a one-time charge of $15,000. Computer Automation is at 18651 Von Karman, Irvine, Calif. 92713.

ISC Color CRT Gets Price Drop

NORCROSS, Ga. — Intelligent Systems Corp. (ISC), has reduced the price of its Intecolor 8001 eight-color intelligent data terminal to $995.

This price applies to orders of 100 or more units. It also applies to a single evaluation unit on a cash-with-order basis. Thirty-day delivery of the unit is guaranteed or the money is refunded, the company claimed.

The Intecolor 8001 comes complete with random-access refresh memory, Intel 8080 microprocessor, terminal control software, a keyboard, a 19-in. eight-color CRT, RS-232C I/O, selectable transmission rate to 9,600 bit/sec. and a user's manual.

ISC is at 5965 Peachtree Corners East, Norcross, Ga. 30071.

Terminal Bows

DALLAS — Crown Communications, Inc., has introduced a buffered data terminal called the CCI 5000.

The unit utilizes a cassette tape for data storage and communication with time-sharing computer centers and, according to the company, offers advantages over keyboard and paper tape send/receive devices.

On-line costs are reduced by the unit's ability to transmit data at speeds 10 times greater than possible via keyboard, Crown claimed. Over dedicated lines, 2,400 char./sec transmission is possible.

The terminal costs "just under $2,000," Crown said from 2750 Northaven Road, Dallas, Texas 75229.

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Unit Detects Disk Problems

User Averts Disaster With $2.50 Device

By Jeffry Beeler
CW Staff

KENNEWICK, Wash. — It could have caused an expensive and destructive head crash, but fortuantely for Kennewick General Hospital here, a defect in a newly purchased disk cartridge was spotted before computer operators had a chance to insert the faulty unit in a disk drive.

How did the hospital discover the damaged cartridge and avert a potential DP room disaster? Credit the feat to a tiny, automatic impact detector that had been attached to the top of the cartridge immediately prior to shipment.

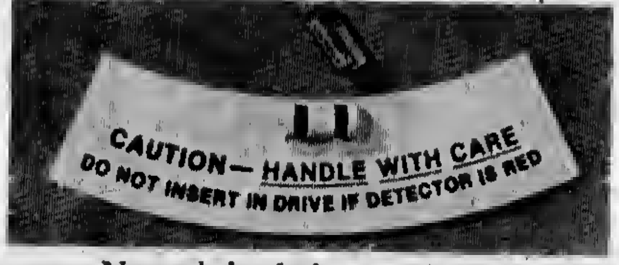
Manufactured by Media Recovery, Inc. in Graham, Texas, the impact sensor fits almost any model of disk cartridge. Although it is sold primarily in large quantities to original equipment manufacturers, it is also available directly to end users for installation in the field.

Shockwatch, as the unit is called by its manufacturer, consists primarily of an .8-in.-long tube mounted on a small plastic plaque that carries handling instructions in bold letters.

Under most circumstances, the tube is colorless. But when it receives an impact of sufficient force, the detector automatically turns vivid red to indicate possible disk cartridge damage.

Ninety-five perent of the time, a cartridge whose impact detector has been activated in this way will cause a head crash or other hardware malfunction if inserted in a computer's disk drive, according to Robert Foley, president of Media Recovery. A message on Shockwatch's plastic plaque therefore warns computer operators not to use any cartridge whose sensor has turned red.

If users heed this warning, they can prevent many head crashes that might otherwise occur as well as minimize downtime, lost data and a host of other common DP ailments, Foley added.


CAUTION— HANDLE WITH CARE
DO NOT INSERT IN DRIVE IF DETECTOR IS RED

Normal shock detector is clear.

CAUTION— HANDLE WITH CARE
DO NOT INSERT IN DRIVE IF DETECTOR IS RED

Shock detector darkens after impact.

More Means Less

Foley admitted disk cartridges equipped with Shockwatch cost slightly more than their unprotected counterparts. But, he argued, this small additional investment — the detectors cost $2.50 each — is insignificant compared with the hardware repair and replacement costs the product eliminates.

"Whenever computer users ask me why they should install impact detectors on their disk cartridges, I'm always reminded of the television commerical in which the guy in the auto body shop says to his customers, 'Pay me now, or pay me later,'" Foley added..

Shockwatch does more, however, than just detect disk cartridge damage after it has already occurred. It also prevents the add-on memory devices from being harmed in the first place, Foley said.

"When computer operators know that every time they make a wrong move the impact detector will blow the whistle on them, they become very careful about how they handle their disk cartridges," he explained.

Nothing probably illustrates the product's value as a hardware protector better than the recent incident at Kennewick General Hospital.

Last February, CFI Memories, Inc., one of Burroughs Corp.'s add-on memory suppliers, shipped the hospital two disk cartriges equipped with the automatic shock detectors..

When the cartridges were inspected upon arrival, hospital officials noticed that both detectors had turned red. Concluding that the cartridges had been damaged during shipment, they returned the products to Burroughs' branch office in Spokane, Wash., which in turn sent them to CFI Memories' headquarters in Anaheim, Calif., for testing.

(Continued on Page 40)

Dry-Silver COM Unit Copies Displays

ST. PAUL, Minn. — A dry-silver computer output microfilm (COM) system has been introduced by the 3M Co.

The 715 combines the advantages of other CRT systems and those of dry-silver units which require no chemical processing, a spokeswoman claimed. The system can photograph an image on a CRT using dry-silver film, a capability which, according to the spokeswoman, was not previously feasible because of the low light levels of CRTs.

The 715 system can also expose traditional wet film, she noted, so users phase into dry film.

A Digital Equipment Corp. PDP-8A minicomputer controls the system. Its architecture permits an overlap of data input processing and camera movement operations, which contributes to a system speed, 3M said.

Operator communications with the system are handled via the command console, whose principal component is a DEC LA36 Decwriter II.

The output speed of the 715 system is less than one minute per fiche, the spokeswoman said. Other features include an orange-colored phosphor in the display tube, a motorized camera mount, intensity control and uniform forms exposure.

The price of the system, whose delivery is expected during the first quarter of 1978, is $137,500 from 3M at Box 33686, St. Paul, Minn. 55133.

Page Printer Works in 20 Sec

TINTON FALLS, N.J. — A thermal page printer that is said to produce a hard copy of a CRT screen in less than 20 sec. has been unveiled by the Perkin-Elmer Corp.

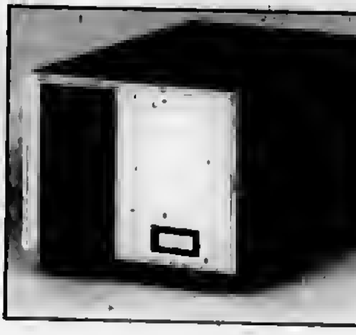
The Model 650 has a full-screen buffer which allows concurrent printing and terminal processing; it can print 100 char/sec on a standard-size piece of paper according to a spokesman.

The paper is impregnated with a colorless, heat-sensitive dye that changes color as selected dots on the printer's fixed head are heated.

This type of printer differs from electrostatic printers, which deposit a substance upon the paper, and from electrosensitive (capacitive) printers, which remove the top layer from the paper, the spokesman explained.

Printing is controlled by a Motorola 6800 microprocessor with a complete screen buffer memory. Data received from the CRT is stored in the 1,920-char. buffer of the page

(Continued on Page 40)



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Detector Helps Hospital Sidestep Disk Disaster

(Continued from Page 39)

Commenting on the results of those tests in a letter dated last Feb. 11, CFI's OEM sales manager, Norman Jividen, told Burroughs officials that one of the disks "had moved on the hub, giving excessive horizontal runout, and inside the plastic cover had a dent in the edge of the disk."

Then he noted, "One of the disks probably would have hit the head if it had been used because there was a dent in the edge of the disk."

In conclusion, Jividen added, "I think this shows the effectiveness and the value of the detector."

How did Shockwatch spot the damaged cartridges at Kennewick General Hospital? Foley attributed the discovery to the unit's sensing mechanism, which he compared to a mercury-filled thermometer.

A small quantity of red liquid is suspended in the device's middle, which is obscured from view when placed in a disk cartridge. If the sensor receives a shock of 115 Gs or more(equivalent to the force of a one-foot fall), the liquid's surface tension breaks, and the red substance spreads throughout the visible portion of the tube.

Rainy Day Idea

The idea for this sensing mechanism originated about two years ago with a member of Media Recovery's engineering staff. While driving home one day after a rainstorm the engineer encountered an unexpected obstacle in the road ahead and hit the brakes to avoid an accident.

As he did so, the sudden stop broke the surface tension of the water droplets on the top of the car and sent them streaming down the windshield.

Immediately grasping the implications of what he had just seen, the excited engineer rushed home and, using a plastic straw and some water, improvised a crude prototype of Shockwatch in his kitchen.

During the next few month, Foley and his engineering staff gradually refined the device and convinced skeptical disk cartridge and drive manufacturers that it would not activate prematurely or otherwise malfunction. Only after months of testing did Media Recovery finally introduce the product last January.

Printer Works in 20 Sec

(Continued from Page 39)

printer, full columns of characters are loaded into a shift register which controls the printing of the characters by the thermal heads, Perkin-Elmer noted.

Because the printer is fully buffered, the CRT can be available for communications with the host in less than 2 sec after the operator presses the CRT "print" key, the spokesman said.

The slew rate for blank lines is 5 ft/min, which enables normal page printing to be completed at a 20-sec maximum for a full page, he added.

The Model 650, which comes mounted in a 4- by 12- by 12-in. case weighs 15 pounds, costs $1,260 from Perkin-Elmer at 106 Apple St., Tinton Falls, N.J. 07724.

Printer System Fits Decsystem

FORT LAUDERDALE, Fla. — Southern Systems, Inc. has introduced an I/O bus interface line printer system for the Digital Equipment Corp. Decsystem-10 that operates with printers from 600- to 1,500 line/min, according to a spokesman.

The S-10 system is capable of driving three printers simultaneously, the spokesman claimed. The interface itself does not require a separate installation rack and can be installed in unused space in the Decsystem, he noted.

No special programming is required with the S-10 and the unit is compatible with the DEC KA, KI and KL processor. It is also software-compatible with all operating systems, he said.

The S-10 system includes power supply, mounting brackets, printer, printer cables and an operations and maintenance guide. It sells for $22,850 with a 600 line/min printer and $41,385 with a 1,500 line/min printer, the spokesman said from 300 N.E. 30th Place, Fort Lauderdale, Fla. 33306.

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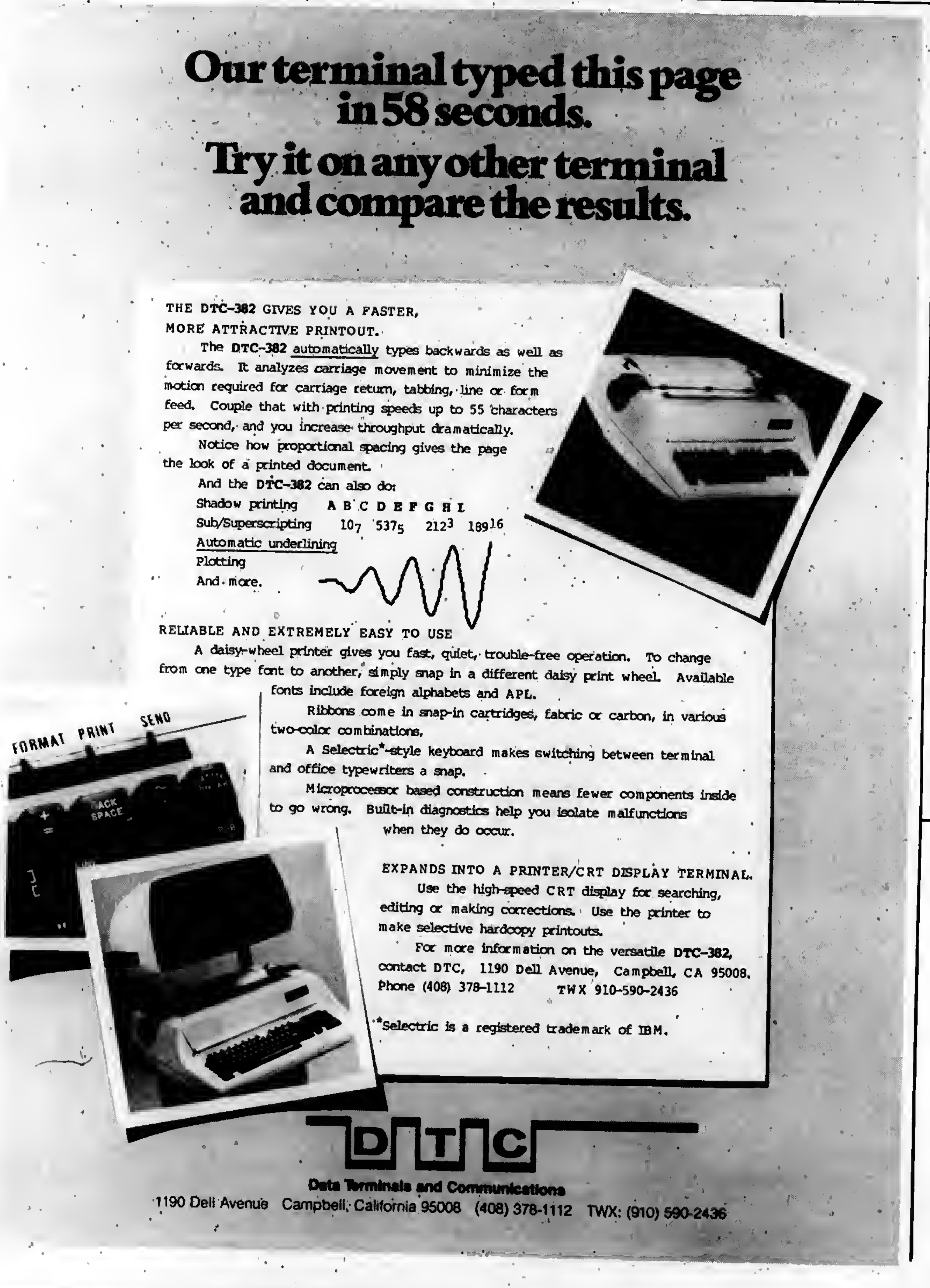

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CDC Tape Subsystems Bow

MINNEAPOLIS — A series of higher performance magnetic tape subsystems that record data at densities of up to 6,250 byte/in. has been announced by Control Data Corp.

The subsystems, encompassing CDC 677 and 679 tape transports and CDC 7021 controllers, are designed for use with the company's Cyber 70, 70 and 6000 series large-scale systems. They provide recording densities and data transfer rates up to four times the maximums previously available with the CDC 667 and 669 subsystems, the firm said.

Six 9-track models comprise the CDC 679 group of tape transports, which operate at speeds of 100, 150, or 200 in./sec. Three models are offered with either 800- or 600 bit/in. densities and NRZI or phase-encoded (PE) recording. The other three have 1,600 bit/in. PE recording or group coded recording (GCR) at a density of 6,250 byte/in.

The CDC 677 transports include three 7-track models that also operate at tape speeds of 100, 150 or 200 in./sec.

Other Features

Other features include internal data loop-checking capabilities and parallel connection of transports to controller so that individual drives can be switched off-line for maintenance without interrupting or affecting operations of the other drives.

Purchase price for the three 7-track transports are $17,500, $21,500 and $24,500. They lease for $416, $512 and $583 per month on a one-year contract and monthly maintenance costs $97, $102 and $133/month, respectively.

The six 9-track transports cost from $18,000 to $30,600, depending on speed, recording mode and density selected. One-year monthly lease prices range from $428 to $680, and maintenance is priced from $97 to $141 per month from Control Data Corp., Box O, Minneapolis, Minn. 55440.

Harris Offers 1600 Family Chain Printer

DALLAS — Harris Corp. has introduced a 1,200 line/min chain printer for its 1600 family of remote-batch terminals.

The Model 1654 features 132 or 136 print position/line, a selector for 6 or 8 line/in. and Ebcdic print chains having 0.095- and 0.079-in. fonts in various paired combinations of 48-, 64- and 96-char. sets.

The unit can be purchased for $65,200, which includes 132 print positions and one Ebcdic print chain. Monthly rental, including maintenance, is $1,490 on a five-year lease. Additional Ebcdic print chains cost $3,500 each.

First deliveries are scheduled for December from the Harris Corp., 11262 Indian Trail, P.O. Box 44076, Dallas, Texas 75234.

MBG-1 Bert Device Measures Tape Bit Errors

BILLERICA, Mass. — A device that provides selective measurements of bit error on magnetic tape systems in the frequency band time from 1 bit/sec to 50M bit/sec has been announced by Tau-Tron, Inc.

The MBG-1 Magnetic Media Bit Error Rate Technique (Bert) stresses magnetic tape recording systems by causing the magnetic tape media to exhibit failure modes.

Price of the MBG-1 is $10,600 from Tau-Tron, Inc., 11 Esquire Road, N. Billerica, Mass. 01862.

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Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

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Firm's Growth Spurs Switch to Mini

By Esther Surden
CW Staff

WINTER HAVEN, Fla. — When the energy crisis spurred tremendous growth for Unisul, Inc. here, the firm turned to an inhouse minicomputer and found that the system provided greater control over data, increased accuracy and better inventory control, according to Garry Hale, DP manager.

The manufacturer of insulation blowing equipment had used a service bureau for its accounting applications but found that the cost was prohibitive. President H.G. Woten decided to look at various small business systems to help solve the problems created by growth.

"We looked at the IBM 32, Burroughs B80, Qantel Corp. and DEC [Digital Equipment Corp.] machines but the one that impressed the owner of the business the most was one from Cincinnati Milacron (CM). It is such an old company and such a huge company that he felt the chances of its going out of business were far less than for some of the smaller firms," Hale said.

The company also had experience with CM through its machine shop, in which it used some CM tools, he noted.

Hale said Unisul "wasn't impressed with the IBM 32" at all.

"A lot of people in this area who had gotten 32s had gotten rid of them," he explained. Also, at the time of the search for a small system, the IBM 32 could not accommodate removable disk packs and was limited in storage size, he said.

Superior Results

"The system has proven to be superior to anything we could imagine," Hale commented.

The company did experience some software startup problems that Hale labeled minor. When Unisul first received its system, the payroll, ledger, receivables and payables application packages that came with it were in their infancy and had some bugs that needed ironing out, he said.

"This was CM's first attempt to write a complete package of programs," he added, "and it had problems because it was rushed to get the programs out to the users."

"I am a programmer and I went to CM's school and cleaned up about 85% to 90% of the problem myself. Since that time, CM has released new additions and has cleaned the packages up," he noted. The packages ran about 85% correct but there were some features the packages wouldn't perform, Hale stated.

From this experience, Hale has some advice to first-time users. Although a mini system probably doesn't need a full-time in-house programmer to watch over it, "it does need somebody who can kind of watch it whenever it has a problem." About 90% of the problems are just operator problems, and "you need someone who knows just a little bit more than the OEMs tend to make you think you need."

Also, having someone "on call" is a good idea, "because every now and then the firm might want to have some maintenance done on its programs. Companies are leaving themselves wide open for problems if they don't at least have a contract programmer in the area," Hale warned.

(Continued on Page 50)

Maintenance Overriding Reason For Series/1 Selection: Input

MENLO PARK, Calif. — The most important reason for selecting the IBM Series/1 over other minicomputers is IBM's "extensive maintenance capability," a survey of 40 Series/1 users indicated.

Conducted by Input, a California research organization, the study noted that other important reasons for the system's selection were its advanced architecture, a price/-performance ratio termed "excellent," the system's interrupt capabilities and the IBM name.

All of the users surveyed were pleased with their systems, Input reported.

Most of the 40 users were OEMs who demonstrated a lack of concern over the fact that IBM does not offer a quantity discount on the system, Input said.

Weaknesses in the system reported by the respondents include the lack of software and lack of a large-capacity disk drive. "However these 'weaknesses' are providing opportunities to software houses, peripheral manufacturers and system integrators to develop software packages and interfaces for the Series/1," the report continued.

Users located in large urban centers where third-party maintenance is available demonstrated more willingness to consider non-IBM peripherals for their Series/1 systems.

The 40 users had a total of 64 units installed and 755 on order and anticipated needing 3,132 additional units within five years.

Eight of the users were performing electronic funds transfer, paper mill control and energy management applications. The 16 users who were systems builders were developing new languages or generalized applications software or were building special systems.

The report costs $4,500. Input is at 2180 Sand Hill Road, Menlo Park, Calif. 94025.

Covering Your Assets

Computerworld will be featuring a special report in December to inform readers about the latest trends and tips on supplies and security.

What are the best, most efficient and least expensive methods to get the numerous supplies you need for your DP work? How do you protect your system from flood, fire or theft?

This is your opportunity to share ideas and experience by submitting an article of 1,200 words, or four to five double-spaced typewritten pages, by Nov. 7 to Ann Dooley, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

Ease-of-Use Features Urged

BOSTON — Manufacturers will have to place "continued emphasis on ease of use," not just for the computer professional but for the end user as well, according to Robert A. Yellowlees, division director of world-wide market requirements for IBM's General Systems Division.

Speaking to an audience at the Common small systems users group meeting here recently, Yellowlees said vendors will also have to be responsive enough to exploit new technology and deliver systems that suit the needs of a variety of users.

Advances in application program development that will ease design programming and maintenance demands on user resources are in the offing, he predicted, while at the same time; small systems must be designed with security and auditing in mind.

In addition, manufacturers are going to have to put continued stress on reliability, availability and serviceability of small systems.

"The problems we face in the future will not center on a lack of technology or lack of product offerings. The continuing challenge we face is achieving a clearer understanding of the needs of each business or organization and how we can channel the power of the computer to meet those demands," he concluded.

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Tom Price

A 200 System Development Manager, Tom is 34 and has 2 children. He is a graduate of Duke University (BSEE) with over 12 years experience in computer system development including 5 years in various management positions. His outstanding speciality is the application of mini-computers to realtime environment.

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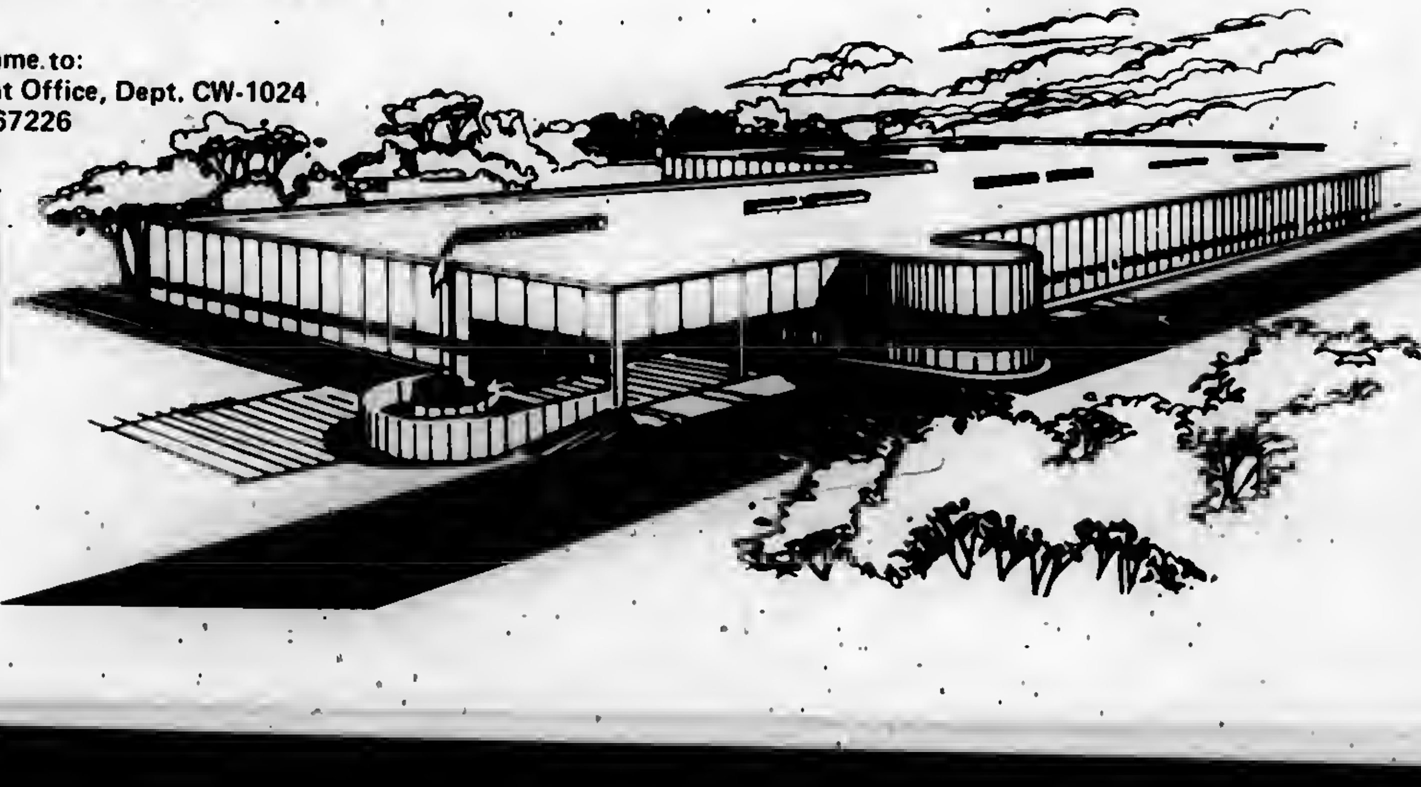

Distribution Control Handled by Turnkey

LONG BEACH, Calif. — An on-line distribution control turnkey system is available from Data Systems for Industry.

The system can be used for all aspects of order entry billing, the firm said, including inventory control at multiple locations, purchasing and cost distribution. Two-way teleprocessing with remote locations can be in either interactive or batch mode.

Based on the HP 1000 system, the turnkey unit's basic configuration can handle up to 75,000 inventory items with an average terminal response time of one second for transactions and inquiries, the company claimed.

The hardware includes 64K words of memory, a 50M-byte disk, a 300 line/min printer, a 1,600 bit/in. magnetic tape drive and two CRT terminals.

It can accommodate up to nine terminals. A dual-processor version handles 24 CRTs.

The basic system, including software and installation, costs $115,000, or $2,300 per month on a five-year lease. Remote job entry capability can be added for $6,000. Data Systems for Industry is located at 3450 E. Spring St., Long Beach, Calif. 90806.

PDP-11s Get Array Boards

NEWTON, Mass. — Computer Design and Applications, Inc. has unveiled a block floating point array signal processor for Digital Equipment Corp. PDP-11 minicomputers.

The MSP-3 is designed on two plug-in boards. It performs only the operation defined in its array library, a spokesman said.

Operations can be executed either by Fortran subroutine calls or by use of host-system I/O instructions under Assembly language. The boards are programmable read-only memory (Prom) driven, but can be reprogrammed by the vendor or the user to accommodate a change of application, he said.

Input data arrays reside in the host's memory and are read and operated on by the MSP-3, the company explained. The 2K words of block floating point memory are located in the MSP-3 for storage of intermediate results.

The unit costs $19,500, or $9,900 in quantities of 25 to 49, the company said from 375 Elliot Street, Newton, Mass. 02164.

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The VA317S is only the beginning, Ma. Before long, all Vadic dial-up modems will have built-in DAA's. Also, Vadic has designed a complete line of stand-alone, rack mount, and card form DAA's.

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Firm Disposes of Paper Problem With Turnkey

GREAT NECK, N.Y. — Busse Hospital Disposables here tossed out a paper congestion problem when it put in a turnkey minicomputer system.

Busse, a 25-year-old-company with an annual volume of about $3 million in sales to the hospital market, has been using the system for more than two years.

"It took four persons to handle our business processing operations when we were doing $2 million a year, and the four were hard-pressed to keep up with the volume. Today, it takes three persons to handle $3 million in sales, and nobody's working under pressure," Emanuel Cardinale, vice-president, said.

Using a manual, ledger card-oriented NCR Corp. system, end-of-month closing for money took about a day and and a half, according to Busse's system supervisor, Margaret Brumfield. With the small system, Busse has an aged trial balance within three hours of closing and is ready to go on to the following month's orders, she noted.

Inventory control is a complex matter at Busse. The product line of hospital disposables includes about 150 finished items, but the component inventory ranges into the thousands.

For example, Busse's disposable sterile tracheostomy care set is a kit comprising 10 items, including the package.

Busse also has to keep track of inventory which is consigned to converters, as well as one product line which it manufactures in a Brooklyn, N.Y. plant. Shipping takes place from Busse's warehouse in Carlstadt, N.J., and from the manufacturing plant, in some cases, drop shipments are made by converters.

Processing of orders is handled by two CRT operators. Using the STC Systems, Inc. Ultimacc Standard Distributor System, Busse makes order entry the starting point for generation of order forms and billing.

The posting of open items for customer accounts, the updating of master files and the manipulation of information for management reports flow from the order entry procedure, Cardinale said.

Under the old system, he recalled, three persons were involved in preparing orders for one machine operator. First, the customer ledger card was pulled and the order attached; the order then went to the bookkeeper for a credit check.

After the order was returned for pricing and inventory control, the invoice was run through the machine. One of the clerks then had to type shipping labels and bills of lading, fill in the weight of the shipment and recalculate the billing extensions to make sure no errors had been made.

The ledger card system had been purchased three years earlier. "We thought it would meet our needs for six or seven years, but as our volume grew the system became less and less functional," Cardinale said.

Credit checking, another important benefit for Busse, helps keep track of the current status of 1,500 customers. "We never had an aged trial balance with our old system. Therefore, an inactive account could remain unpaid for a long time without necessarily attracting our attention.

"Of course, a new order would stimulate a demand for payment, but we couldn't rely on that to keep current. With Ultimacc, we have a much better handle on receivables," Cardinale said.

Slow Decision

The decision to acquire a minicomputer-based system was slow in coming. "The small businessman doesn't think in terms of a computer to solve this type of problem. Most of us believe computer systems are too sophisticated for such matters and far too expensive," Cardinale explained.

After being solicited by a sales representative and after seeing a system in operation at a business of similar size on Long Island, Busse hired a consultant to consider minis from STC, IBM Basic/Four and NCR. "With our consultant's help, we decided that Ultimacc was most appropriate for our needs," Cardinale said.

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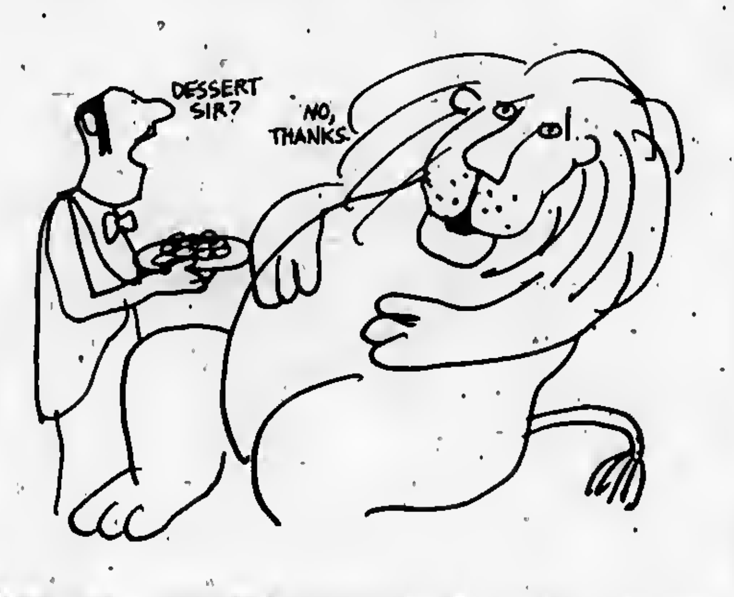
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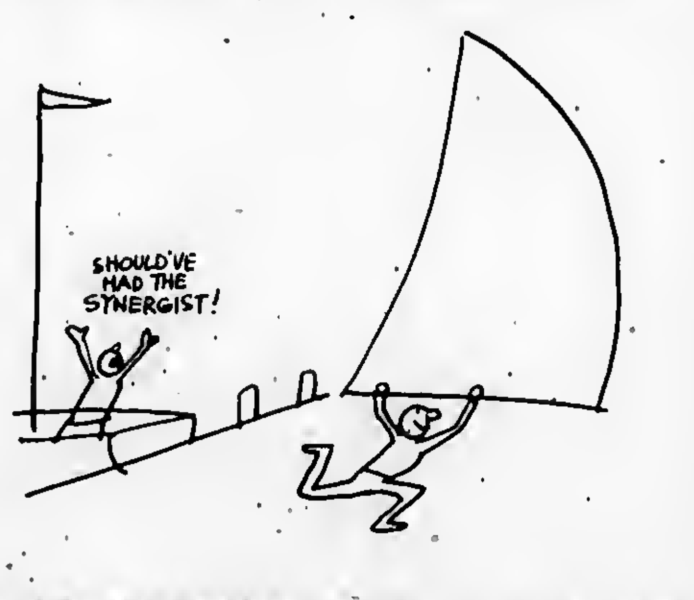
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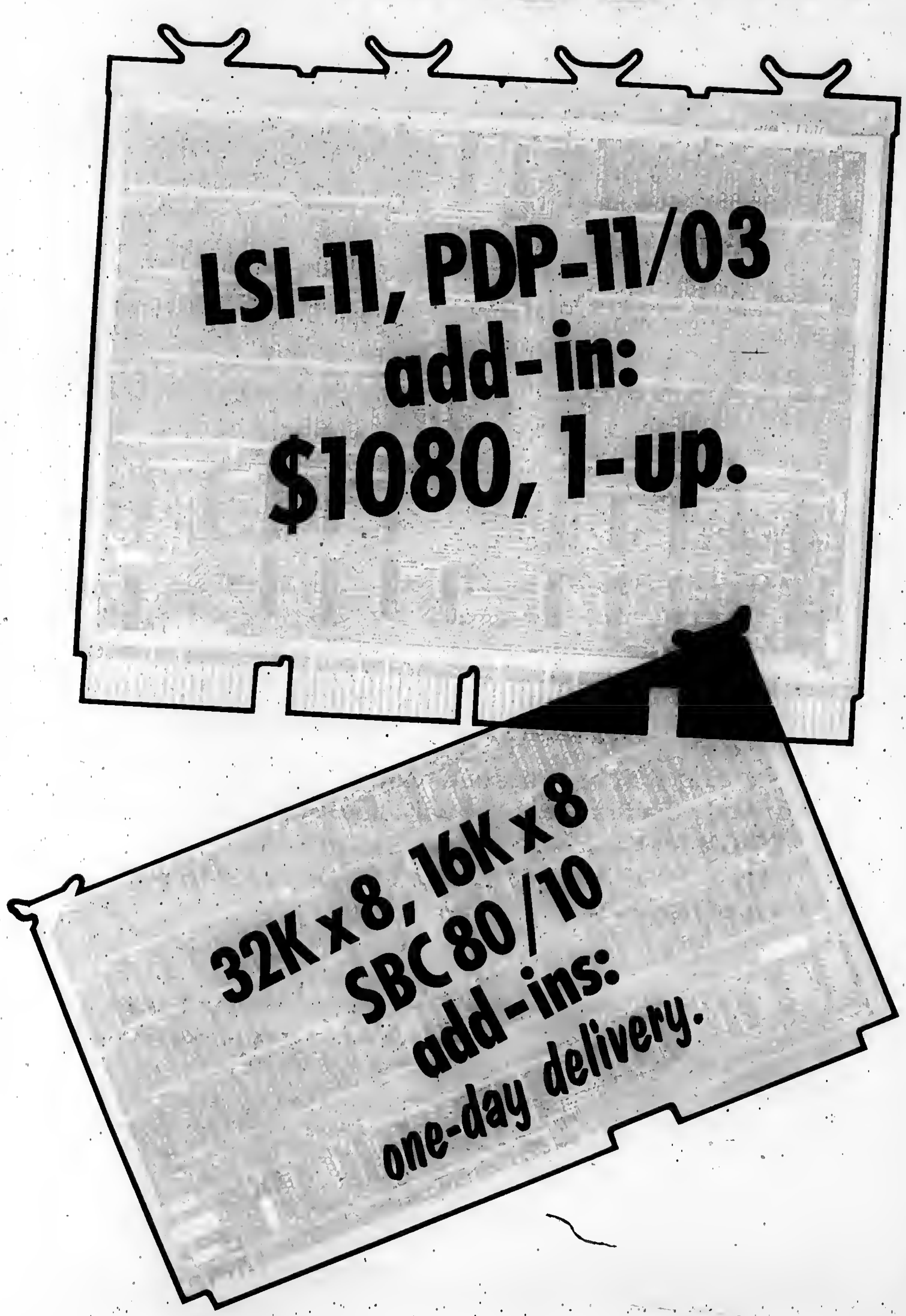

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MMS68103 MMS68103-1 MMS68103A MMS68103A-1	16K x 8 8K x 8 16K x 9 8K x 9	Battery backup for M6800 and other synchronous systems; pin compatible with EXORciser* micromodule
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MOTOROLA Memory Systems

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Who Decides on Mini Purchase? It Depends

By Esther Surden
CW Staff

Who makes the final purchasing decision when it comes to minicomputers?

In a recent CW survey, some of the answers to this question were:

The board of education, board of supervisors, top management, a partner, controller, DP department, city council, corporate officers, chief executive, executive committee, board of directors, auditing firm, president, systems department, vice-president of finance, hospital controller and engineering consultant.

You get the idea. There is no set final authority on minipurchases across various company and industry lines.

The choices of answers supplied in the survey were "end-user department, central purchasing department or central DP department," but for the majority of the 220 respondents these answers were far too simplistic. Of those users who did choose one of our supplied answers, most said the central DP department had the final say on buying a mini. Next most frequently listed was the end-user department.

For some, the decision to buy was very complicated. One user wrote that "the end-user department, within guidelines established by a central DP department and subject to implementation of controls in compliance with standards set by the central DP department and DP auditors," decided.

A user of 14 minicomputers scattered throughout the U.S. noted that the final decision about purchasing minis for his organization was made by end-user departments, although in some cases strong pressure was exerted by systems management for users to accept, even if the user was reluctant. This has "created user resentment at times. In at least one case, the system failed and the user sent the mini back," he reported.

Several users were in the process of switching from a situation in which the final decision was made by an end-user department or division to one in which control is centralized. An MIS director of a large toy corporation described a firm whose "autonomous companies bought the wrong computer." Confronted with a grab bag of different gear, the company has since centralized purchasing control under the DP department.

Growth Spurs Switch

(Continued from Page 43)

Hardware at Unisul includes the CM 2000 CPU with 64K of MOS memory. It's a multiprogramming system with foreground/background partitioning.

The system has three CRTs, one Dataproducts Corp. 300 line/min printer and two 5M-byte Iomec disk drives.

"This is the same configuration a lot of the mini [makers] are using. They are building their own CPUs and using other people's drives," he said.

The CPU was originally designed as a controller for the CM machine tools, Hale explained, so it can work in even the worst environments.

Beside the regular accounting functions, the system is running an inventory package designed by the firm. The package explodes all the parts necessary to build the insulation blowing machines and forecasts how many parts will be needed and when.

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More 'Giant Steps' in Store

Micro World Seeing Dramatic Changes

By Phil Roybal
Special to CW

The world of personal computing has taken some giant steps since the first Mits, Inc. Altair system made its debut. In less than three years it has progressed from crude hardware kits to completely integrated, high-level language systems sold ready-to-run by mass retailers. Hardware prices have also changed dramatically.

Back in 1976, when most customers were still engineers, a user buying a Basic language system with a CRT terminal and tape cassette storage would have to spend about $2,300. While rumors hinted of machines like Processor Technology, Inc.'s SOL System that would cut system prices, in the spring of this year, industry watchers were anticipating only that a $1,200 personal computer might appear by year's end.

Then along came Commodore's PET at $495 (later raised to $595), a ready-to-run system with peripherals built in. It represented a significant breakthrough by demonstrating interest from a major manufacturer and system prices within the consumer range.

Now, with competition from Tandy Corp., Apple Computer and Heath, Inc., system capabilities are exploding as average prices drop sharply.

The driving forces in the world of personal computing are the emphasis on high-level languages, more sophisticated output devices and lower system costs. These factors put a premium on:

- Large memories — because language translators take a lot of memory themselves and their use encourages the creation of larger programs.
- Processor performance — because interpretive languages are relatively slow and need all of the processor horsepower they can to handle many video graphics and game applications.
- Interfaces — because sophisticated interfaces can cut the cost of peripherals.

Change Shaping Up

From a semiconductor point of view, here is how changes will most likely shape up in each of these three areas.

Looking at microprocessor units (MPUs), the 8080A is today's biggest seller in the personal computing area, with the Z80 moving up rapidly. However, Commodore's market entry may make the 6502 the volume leader.

But already, the industry is moving up toward the 16-bit MPUs. Several vendors offer 16-bit systems and there will be others within a year.

Of the 16-bit systems, those that are software-compatible with existing minicomputer families offer the most for the software-minded, because they allow the user to tap the extensive libraries already available for their big brothers. Such 16-bit systems will generally offer speed and memory efficiency advantages over the 8-bit systems; and as they become more popular,

(Continued on Page 54)

Micros Seen Brain Developers

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The advent of the personal computer signifies the first time a tool has been developed to expand the brain instead of the muscle, Dr. Portia Isaacson, professor of mathematical science at the University of Texas, said at the Data Processing Management Association (DPMA) conference here recently.

Personal computing is the most significant of all technology-based revolutions, even more so than the printing press, Isaacson said. Its growth will result in millions of sales in the very near future, she added.

There are already more than 300 computer hobbyist clubs in this country, and the one in Dallas has two meetings a month with attendance levels of over 100. "Unfortunately, DPMA, ACM and IEEE don't draw as well," she said.

The computer hobbyist is now involved in "the elite of hobbies . . . Most have serious applications," she said. However, personal computing is not only a hobby.

Store Owner

Isaacson is coowner of a computer store and stated that only 20% of sales are made to hobbyists — the others are made to businesses who use the inexpensive microprocessors for their DP needs.

These computers are replacing time-sharing and minicomputers for the small business, Isaacson said, because they represent the lowest cost computing.

The typical small business computer has 32K bytes of storage, a hard-copy terminal and dual floppy disks. "The personal computer is not small, it's just cheap," she said.

The language used is Basic, but with many variations. "People are willing to program in any language you give them as long as you just call it Basic," Isaacson continued.

The other large appeal for personal computers is home computing (as opposed to business and hobbyists), which would mean a personal computer in an integrated package, costing $600 to $900 and having enormous program libraries, she said.

The two main uses of home computing will

(Continued on Page 52)

Naked Mini to be Retailed

IRVINE, Calif. — Computer Automation's Naked Mini minicomputers will be sold in retail stores for the first time beginning this month through a new computer store operation of Tandy Corp. of Fort Worth, Texas, operators of the National Radio Shack chain.

Users will be able to purchase the first retailed Naked Minis when the first Tandy Computer Store opens in Fort Worth this month, according to a Computer Automation spokesman.

The minis will be sold over the counter in small business-oriented systems packaged by Tandy or as stand-alone units that professionals or hobbyists will be able to incorporate into their own systems, the spokesman said. The Computer Automation products will also be incorporated into the Tandy catalog for mail order sales.

The system package by Tandy will include Computer Automation's distributed I/O system — using intelligent cables that enable the minis to work with virtually any peripheral device, the spokesman claimed. The systems will also work with floppy disk controllers, operating systems and both the Fortran and Basic languages, he added.

Applications programs for the small business systems will be supplied by Tandy, which will also supply customer service.

The Naked Mini LSI 4/10 minicomputers to be offered by Tandy are general-purpose, 16-bit systems with 4K-, 8K-, or 12K-words of storage expandable to 64K words.

The Naked Mini is so-called because it was originally conceived as a low-cost computer on a circuit board that could be designed into a system as a component, the spokesman explained, noting that the firm's systems are also available fully packaged, with chassis, power supply and control panel.

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Keyboard Permits Tailoring, Features Alpha Lock Key

WAUKEGAN, Ill. — A keyboard designed for the personal computer and hobbyist user who doesn't want to work around a totally dedicated unit has been introduced by the Cherry Electrical Products Corp.

Designated the "Pro," the keyboard features an alpha lock key that changes output from typewriter to teletypewriter code and five unassigned relegendable keys. The keyboard can piggyback a "daughter" board easily, a spokesman claimed, noting the device can be customized by the user.

Among the keyboard's standard features are a full 67-key array including five user-definable, unassigned and relegendable keys; 128-character Ascii output; four modes (lower case, upper case, control case and teletypewriter alpha lock configuration); transistor-transistor logic (TTL) and (DTL)-compatible output circuitry; and a single power supply voltage of 5V.

The keyboard lists at $135. Charts, diagrams and detailed specifications are available from F. Amendola, c/o Cherry Electrical Products Corp., P.O. Box 718, Waukegan, Ill. 60085.

Micros Seen Brain Tools

(Continued from Page 51)

be entertainment — "in a really new form that is intellectually challenging" — and education.

With a home computer, one could simulate the stock market, do sophisticated astrological analyses, play "Star Trek" (a computer game) all you want, run a computer dating service, learn to write programs, start a biorhythm business, project personal finances, chart the family geneology, keep a stamp collection inventory, control model railroads and hundreds of other applications, Isaacson conjectured.

Personal computing will eventually change the computer industry, she said. There will be a loss of control by DP centers of computing, it will replace time-sharing and computer education will be common, Isaacson added.

Elitism Waning

"Now we (DP personnel) are in an elite group, but soon being in computers will be like being in stereos."

But most important, "computer inventiveness will be in the public domain," she said. Whereas previously only large universities and corporations did research and development, now everyone can afford to experiment, she said.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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absolute address — 1. An actual location in storage of a particular unit of data; address that the control unit can interpret directly. 2. The label assigned by the engineer to a particular storage area in the computer. 3. A pattern of characters that identifies a unique storage location or device without further modification (Synonymous with machine address.)

accumulator (AC) — The accumulator is a 4-, 8-, 12- or 16-bit register that functions as a holding register for arithmetic, logical and input/output operations. Data words may be fetched from memory to the AC or from the AC into memory. Arithmetic and logical operations involve two operands, one held in the AC, the other fetched from memory. The result of an operation is retained in the AC. The AC may be cleared, complemented, tested, incremented or rotated under program control. The AC also serves as an input/output register. Programmed data transfers pass through the AC.

adapter — A connective device designed to affect operative capability between different parts of one or more systems and/or subsystems.

adapter plug — Refers to a fitting designed to change the terminal arrangement of a jack, socket or other receptacle so that other than the original electrical connections are possible.

A/D analog-digital converter — Circuit used to convert information in analog form into digitial form (or vice versa), e.g., in a digital voltmeter.

address — 1. A character or group of characters that identifies a register, a particular part of storage or some other data source or destination. 2. To refer to a device or an item of data by its address.

addresses, memory — Every word in memory has a unique address. A word may be defined as a set of bits comprising the largest addressable unit of information in a programmable memory. The address of a word is its location in memory.

add time (in microseconds) — The time required to acquire from memory and execute one fixed-point add instruction using all features such as overlapped memory banks, instruction look-ahead and parallel execution. The add is either from one full word in memory to a register or from memory to memory, but not from register to register.

Algol — One of the international program languages designed for the concise, efficient expression of arithmetic and logical processes and the control (iterative,etc.) of these processes. Taken from Algorithmic Language.

algorithm — A prescribed set of well-defined rules or processes for the solution of a problem in a finite number of steps, for example, a full statement of an arithmetic procedure for evaluating sin x to a stated precision. Contrast with heuristic.

LEARNER'S LEXICON

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More Dramatic Changes in Store for Micros

(Continued from Page 51)

they will be the frontrunners for new software developments.

But there is more to come. Mark Shepherd, Jr., chairman and chief executive officer of Texas Instruments, has predicted the arrival of single-chip, 32-bit microcomputers with 1M bits of on-board memory by the early 1980s. The processing power inherent in such systems staggers the mind.

Perhaps the advance most likely to stir the imaginations of personal computer fans is the introduction of high-level language MPUs, which need no compilers or interpreters because they directly execute high-level code. Such machines could be on the market within a year, from at least two different sources.

They are the ultimate in speed and memory efficiency for high-level language enthusiasts, at the price of being hardware-bound by someone's idea of the best "all-around" language. It will be up to the user to decide if the performance advantages are worth this price.

These processor developments will be of great importance to potential customers, because:

- The processor's speed, instruction set and architecture determine the bounds of systems performance; and
- The processor's instruction set limits the choice of available software. It is usually difficult to later upgrade the system processor without losing the user's software investment.

Memories account for between 25% and 75% of a system's cost, so advances in density and production yields are important to users as their systems grow.

Most systems today rely upon 1K (static) or 4K (static or dynamic) random-access memory (RAM) chips, with a few advanced designs using the newer 16K dynamic RAMs. Boards made from the older devices are selling for less than .3 cents per bit. As 16K dynamic RAMs come into full production over the next year, improvements in process knowledge, memory cell size, wafer size and mask lithography techniques will allow the industry to cut the user costs dramatically with these denser memory devices.

The read-only memory (ROM) content of personal computer systems will rise substantially from today's average of 1K byte per system to 16K bytes per system in the early 1980s. This is a consequence of greater emphasis upon high-level language firmware and the price differences between ROM and RAM (more than 2;1 at present), which favor using ROMs if the programs don't have to be changed.

Future personal computer users can expect systems with complete language processors and monitor firmware contained in ROM. Instead of switch flipping and bootstrapping their electronic genies into life, the users will be able to "plug in, turn on and run."

Most memory developments will benefit today's users and future buyers in that system memories can be inexpensively expanded.

Interface devices will account for more of the cost of personal computer systems as processors become powerful enough to handle complex peripheral devices.

Developments in this area will allow users to expand existing systems at lower cost, rather than making those systems obsolete. The devices most likely to impact the user within the next two years include: speech and music synthesizer devices, dual-density floppy disk interfaces, CRT/-light pen interfaces for alphanumerics and static graphics, phone dialers, modems and color graphics interfaces.

The personal computer industry is presently about where the calculator industry was in the early '70s. Advanced products existed in the labs somewhere, but neither the manufacturers nor the public yet realized the multimillion-unit volume potential of the market; nor the price reductions that advances in technology would bring. And, just as calculator prices have dropped dramatically since then, so will the prices of personal computers drop as the market climbs to more than $1 billion by 1981.

Is this the time to buy a computer, or should one wait?

I plan to buy this year. I will get the most powerful processor available, since this will determine the ultimate capacity of my system. I will plan for future expansion of memory and peripherals as prices drop and new devices become available.

While I'm sure that any given system's market price will soon drop dramatically, I can do an awful lot of problem solving while others wait for the "ultimate" system to appear.

Roybal is the business manager for personal computer components with National Semiconductor in Santa Clara, Calif.

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Vice President, Sales
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Computer Caravan Tour 1977

NCI WAS THE FIRST of many companies to reserve space in the Computer Expo for 1978. By signing early, NCI, an Expo veteran, was assured prime booth positioning in all nine cities for the tour beginning again this March. Along with many others, NCI has found that the 1978 Computer Expo is the place to be. It means business. . .for them, and for you.

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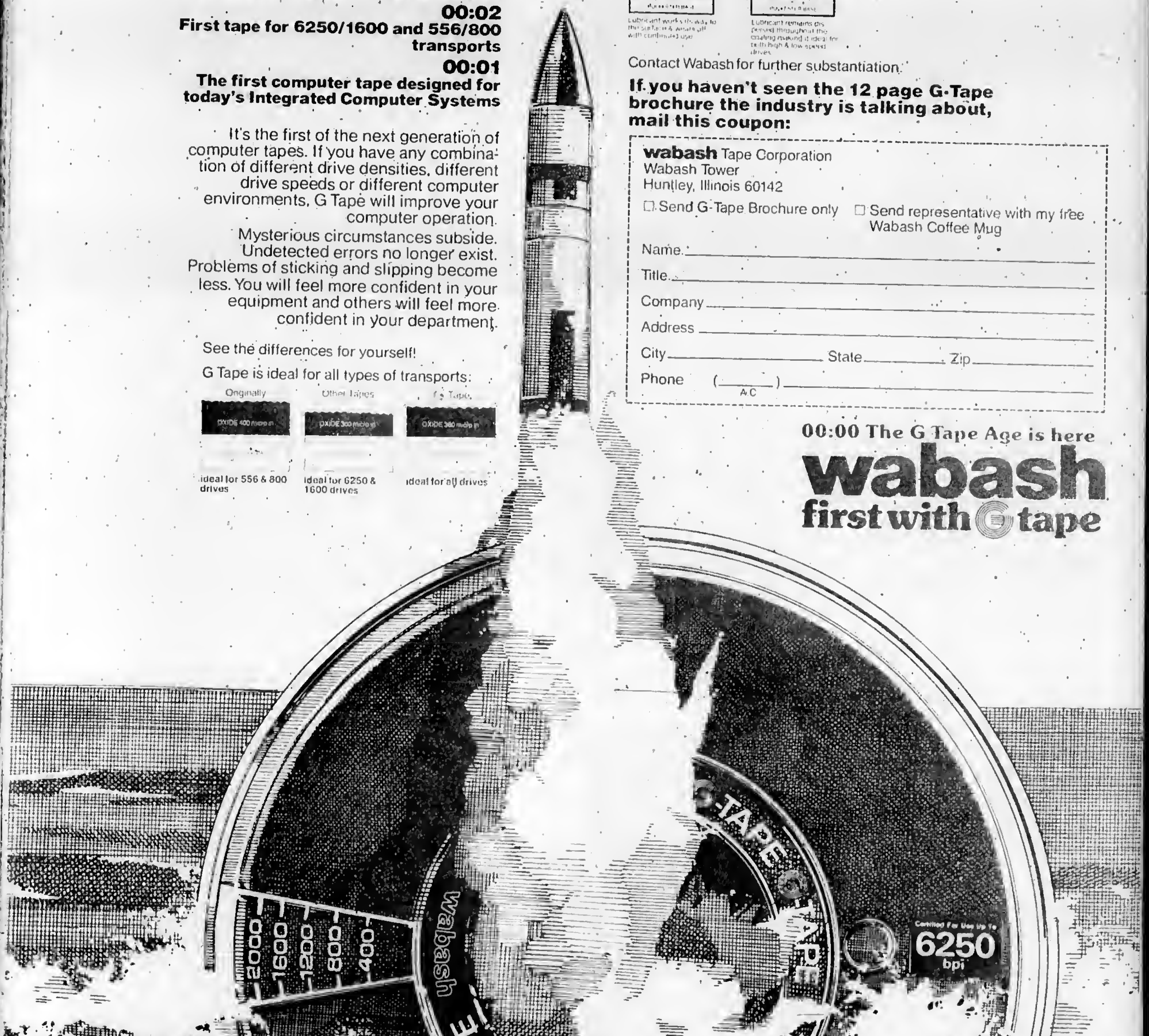

TI Makes 'Off-the-Job' Offer

DALLAS — Texas Instruments, Inc., has extended the problem-solving power of its programmable calculators for off-the-job enjoyment by introducing a library of solid-state software programs.

The Leisure Program Library for the TI Programmable 58 and 59 calculators contains 20 different programs for golfers, bowlers, chess players, football fans, bridge players, photographers and others interested in using the calculator for entertainment.

Golf Uses

Golfers, for instance, can use the library to save time when figuring United States Golfers Association (USGA) handicaps; bowlers can keep score for up to 90 players who are bowling simultaneously.

Other programs can calculate biorhythms, land a spacecraft safely on Mars, simulate sea battles and play blackjack, Acey-Deucy, Craps, Nim and other games.

Expires Next Week

The plug-in program library module and manual is available free to purchasers of TI 58 or 59 calculators who mail their customer information card and dated proof of purchase showing the calculator's serial number before Oct. 31 to Leisure Library Offer, P.O. Box 53, Lubbock, Texas 79408.

After Oct. 31, the library will be available at a retail price of $35.

For Next 12 Months

Micro Shows on the Way

Trying to figure out how to schedule vacation time and money to take in a hobby computer show or two can be a trying affair. And it often seems like everyone else knows about the big shows, but the information never passes your way.

As a reader service, *Computerworld* will publish a regular listing of known microcomputer shows. Included in the listing will be the name of the show, date, location and the name and address to contact for further information.

1977 Shows

Oct. 27-29, Chicago — **'77 Midwest Personal Computing Show.** Contact: Louise Garcia, Personal Computing Magazine, Suite G, 401 Louisiana, Albuquerque, N.M. 87108.

Oct. 28-30, New York — **Personal Computing Exposition.** Contact: Ralph Ianuzzi, H.A. Bruna & Associates, 78 E. 56th St., New York, N.Y. 10022.

Nov. 8-10, Toronto — **Personal Computing Showplace.** Contact: Derek A. Kidd, Industrial & Trade Shows of Canada, 481 University Ave., Toronto, Ont. M5W 1A7, Canada.

Nov. 28, Gaithersburg, Md. — **Personal Computing.** Contact: National Bureau of Standards, Gaithersburg, Md.

1978 Shows

Feb. 27-March 1, Philadelphia — **1978 Business and Personal Computing Sale and Exposition.** Contact: Produx 2000, Inc., Convention Services Department, Roosevelt Blvd. & Mascher St., Philadelphia, Penn. 19120.

March 3-5, San Jose, Calif. — **Second West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302..

April 28-30, Long Beach, Calif. — **Percomp '78** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif. — **National Computer Conference & Computer Festival.** Contact: Steve Miller Stanford Research Institute, 333 Ravenswood, Menlo Park, Calif. 94025.

July 23-25, Detroit — **Macc Computerfest '78.** Contact: Jim Rarus, Semco, Box 9578 North End Station, Detroit, Mich. 48201.

Aug. 25-27. Atlantic City — **Personal Computing '78** Contact: John Dilks, Rt. 1, Box 242, Mays Landing, N.J.

Oct. 27-29, Los Angeles — **Third West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.

Xycon Allows Multiple MPU Master/Slaves

HAYWARD, Calif. — Computer Systems Unlimited has introduced the Xycon III microcomputer, which reportedly has features that enable the use of 8- or 16-bit modules and can use multiple microprocessor units (MPU) on a master/slave basis.

Each system is fully assembled and tested, then "burnt-in" for an extended period of time to assure immediate and continuous operation.

The Xycon III system software consists of an auto boot, a read-only memory (ROM) supervisor, an assembler and a text editor. Also available are Disk Basic and Fortran IV Compiler.

The basic microcomputer costs $4,200, which includes 16K; complete systems begin at $7,500. More information can be obtained from Computer Systems Unlimited, 25903 Peterman Ave., Hayward, Calif. 94545.

Store Opens in N.J.

RAMSEY, N.J. — The Typetronic Computer Store at 806 Route 17 here opened for business Oct. 17.

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Edited by Ron Frank, *Data Communications Networks* will examine the often confusing array of protocols, architectures, equipment and transmission methods available. And, it will help you understand the guidelines to use for configuring or expanding your network, with tutorials and applications stories on how effective networks are designed and maintained. Here's a sampling of the kinds of stories you'll see.

- Selecting the right terminal for the right job in the right network
- Case histories of successful networks and how they were designed and configured
- An evaluation of IBM's Systems Network Architecture
- The tradeoffs between private line networks and packet networks

If you're involved with data communications, or if you expect to be in the not too distant future, our November 28th special report will help you have what you need to know. And if you market data communications equipment or services, our report is where you should advertise. Ad closing date is November 11. For details, contact your *Computerworld* salesman. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Burroughs, NCR, CDC and IBM

Mainframers Set Nine-Month Records

By E. Drake Lundell Jr.
CW Staff

Mainframe computer companies appear headed for a top-flight year as Burroughs Corp., NCR Corp., Control Data Corp. and IBM all reported record revenues and earnings for the first nine months of 1977.

At IBM, earnings increased 18% while revenues jumped 16% during the third quarter compared with the same period last year. In total, the firm increased its earnings by 12% on a revenue hike of 11% during this year's nine-month period.

At Burroughs, the third-quarter earnings rise amounted to 16% on a 11% hike in revenues, but for the nine-month period the firm posted a higher performance, showing a 17% increase in profits on a 10% revenue increase.

NCR did even better in terms of percentages, racking up a 33% earnings increase in the third quarter and 48% growth for the first three quarters of the year. Revenues increased only 6% in the quarter and 9% for the year, however.

CDC reported a 15% improvement in nine-month earnings and third-quarter results that were 7% better than those of the same period last year.

The chief executives of each firm had varying reasons for the increases.

At IBM, Frank T. Cary, chairman, said an increase in outright sales caused the jumps. The sales of equipment, as opposed to leases or rentals, set a record for any quarter in the company's history, he noted.

During the third quarter outright sales for the company as a whole totaled $1.85 billion compared with $1.37 billion in the same span a year ago.

Rental and service income, on the other hand, rose only 5.7% and was under the level set in the second quarter of this year.

At Burroughs, Chairman Ray W. Macdonald said the good showing in the third quarter proved the firm could weather price cuts.

In an interview with the *Wall Street Journal,* Macdonald recalled that when IBM began cutting prices earlier this year, many observers wondered if the other firms in the business would be able to continue growing.

The records at NCR, according to William S. Anderson, chairman, are attributable to the firm's ability to improve profit margins both on equipment and services.

At CDC, data services were particularly strong in the third quarter, recording a 21% gain in revenues over the same quarter a year ago, according to Chairman William C. Norris.

However, results were also boosted by "a higher than anticipated level of purchase conversions of previously installed equipment" and good demand for the firm's largest systems.

In addition, all of the chief executives predicted — or at least implied — that the growth would continue.

IBM does not make predictions on the future, but Cary did indicate that "incoming orders" continue at a high level and that such orders are running ahead of the orders in the same period a year ago.

At NCR, Anderson said that firm expects fourth-quarter earnings to surpass last year's, which would push the firm to an overall record year.

Macdonald also predicted that Burroughs will set earnings and revenue records for the year, but he declined to predict specific figures for the fourth quarter or the year.

In the raw numbers, the four firms stacked up this way:

IBM earned $690.4 million or $4.66 a share on revenues of $4.59 billion during the third quarter, compared with $586.9 million or $3.90 a share on revenues of $3.96 billion a year earlier.

(Continued on Page 59)

I-8100 Called 'Cornerstone' for NCR

By Esther Surden
CW Staff

DAYTON, Ohio — NCR has "learned to charge for everything like our big brother" does, chairman William S. Anderson said here recently during festivities that heralded the firm's I-8100 series of small business computers.

The remark was his way of explaining the firm's reason for unbundling operating system software, application programs, education and documentation offered with the new systems aimed at first-time users [CW, Oct. 17].

The I-8100 systems are frankly targeted at replacing "countless thousands of accounting machines and accounting computers currently in use throughout the world," a large number of which are used by current NCR customers. Anderson described the I-1800 as a "cornerstone in NCR's strategy" to make inroads into this marketplace.

The 499 user will not be able to migrate into this system, he continued.

The I-8100 is significant in that it has a "price comparable to that of an accounting computer" and offers "upward migration into larger systems," he said.

NCR president Charles E. Exley readily admitted that there was nothing startling or technologically innovative about the products announced. The systems are, however, important to NCR because the potential market for small business systems is "huge" and "the strongest trend in small systems today is the trend toward interactive processing," he added.

The small systems are upwardly compatible with the larger systems in NCR's line, Anderson noted, adding that the firm's concentration on the small system does not indicate "the era of the large computer has passed," but rather "the era of the small computer has arrived." NCR remains committed to large-scale users and will introduce two new large-scale systems in the 8000 line later in the year, he said.

Market Targets

The I-8100 will be marketed to manufacturing companies, wholesale/distribution firms, financial institutions, retail stores, hospitals, schools and government users, Exley stated. "There are in this country alone more than 80,000 small manufacturing firms that have between 10 and 150 employees. The vast majority of systems currently in use by these companies are rudimentary," he noted.

"The price of EDP equipment is a critical factor" for most of the small companies and for the most part, these companies have neither the desire nor the expertise to install electronic systems. NCR, Exley continued, is providing a system that offers ease of installation and use at a price the company feels these businesses can afford.

NCR sees the Burroughs B80, IBM 32 and 34 and Univac BC/7 as the biggest competitors for the system. The B80 runs under a batch update operation, a spokesman noted. In comparison with the IBM 34, interactive industry application packages for the I-8100 will be available shortly as opposed to IBM's long lead time on products, the spokesman added.

The system is user-installable with very little help from NCR and the "lower the installation cost, the higher the profit margin despite unbundling," he continued.

Designing the I-8100 with a team system programming development approach produced this system that can be installed "with virtually no support from the vendor." Team members included an industry specialist, interactive specialist and education and documentation specialists.

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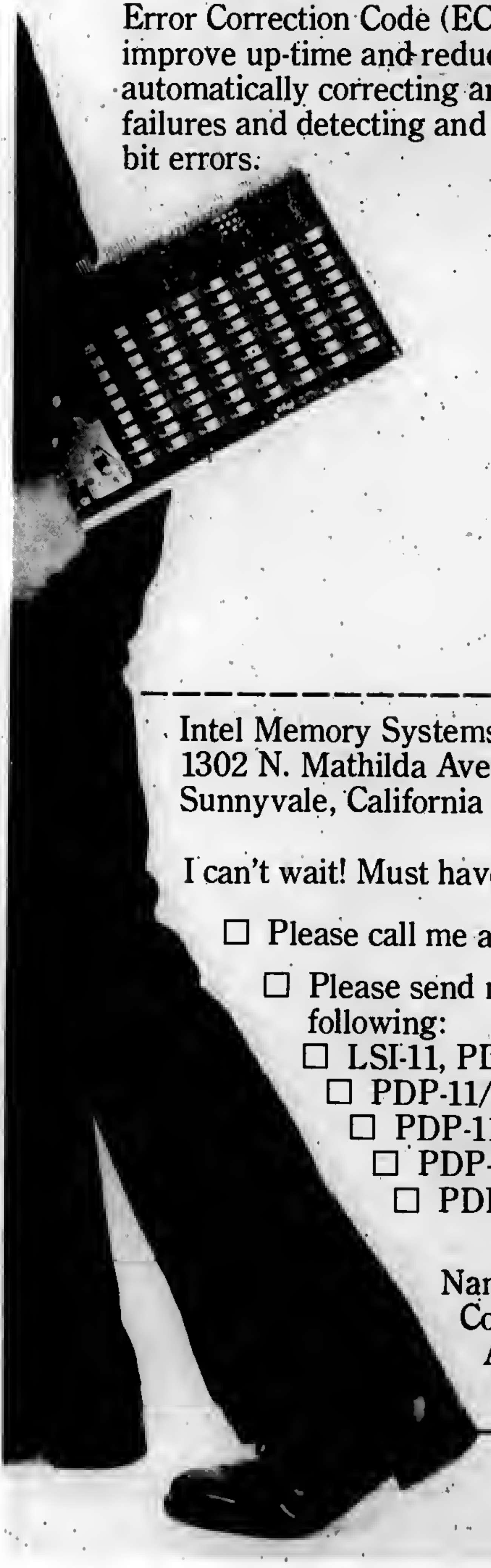

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CI Notes

CCIA Members Plan Conference

BEVERLY HILLS, Calif. — The Computer & Communications Industry Association (CCIA) will hold a membership meeting here on Nov. 15-16 at the Beverly Wilshire Hotel.

The program will feature a presentation by Peter Cunningham, president of the market research firm Input, who will present scenarios and forecasts in such areas as IBM-compatible mainframes, firmware, value-added networks and software developments.

In addition to that presentation, Billy Oliver, vice-president for engineering planning at AT&T's Long Lines Department, will discuss "The Evolving Bell System" and a panel will cover the possible effects of President Carter's tax reform proposals on small and medium-sized businesses.

Information is available from the CCIA at Suite 512, 1500 Wilson Blvd., Arlington, Va. 22209.

Stockholders to Decide HIS, Incoterm Match

MINNEAPOLIS — Incoterm Corp. will be merged into Honeywell Information Systems, Inc. if a stock deal worked out by the two companies is approved by the stockholders of Incoterm.

The transaction calls for the 2.1 million outstanding shares of Incoterm stock to be converted into Honeywell stock at the rate of one Incoterm share for .42 shares of Honeywell.

The ratio assumes the average price of the Honeywell stock will be in the $40 to $50 range during a 10-day period before the proxy material is distributed to Incoterm shareholders.

If the Honeywell stock increases, fewer shares would be exchanged, but if it decreases the number of shares exchanged would go up.

However, if the Honeywell stock goes over $60 or under $35 per share during the period before the merger is complete then the two firms would go back to the drawing boards on the agreement.

The transaction will be structured as a nontaxable corporate reorganization, HIS said.

CDC Begins Delivering 9380 to Macro

MINNEAPOLIS — Control Data Corp. said it has begun deliveries of its 9380 line of OEM printers to the Printer Sales Co. Division of Macro Products Corp., Long Beach, Calif.

The deliveries are part of a three-year contract valued at about $3.5 million for the 300-, 600- and 900 line/min band printers that optionally print 15 char./in.

The contract represents the first agreement that combines CDC product deliveries with its equipment maintenance and peripheral financing services, CDC said.

Mainframers Post Records

(Continued from Page 57)

For the first nine months, IBM earned $1.92 billion or $12.92 a share on revenues of $13.1 billion compared with earnings of $1.72 billion or $11.47 a share on revenues of $11.79 billion in the year-ago period.

Burroughs earned $43.2 million or $1.06 a share in the third quarter and $121.1 million or $2.99 a share in the nine-month period. Revenues were $490.3 million and $1.45 billion respectively.

This compared with year-ago earnings of $37.2 million or 92 cents a share in the quarter and $103.9 million or $2.58 a share in the first three quarters. Revenues were $443.2 million in the 1976 quarter and $1.31 billion in the nine-month period that year.

At NCR, the third-quarter net totaled $33 million or $1.18 a share compared with $25 million or 93 cents a share a year ago. Revenues increased from $569.5 million in last year's quarter to $604.2 million this year.

For the entire nine months, the firm earned $84.3 million or $3.02 a share on revenues of $1.75 billion compared with the year-earlier figures of $56.8 million or $2.19 a share on revenues of $1.6 billion.

CDC reported net earnings of $16 million or 93 cents a share for the third quarter compared with $15 million or 87 cents a share in the 1976 quarter.

For the nine months, earnings totaled $42.3 million or $2.45 a share compared with $36.7 million or $2.12 a share in the first three quarters of 1976. Revenues were $373 million and $1.1 billion respectively.

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Software to Play Strong Role

Net From General-Purpose CPUs to Rise: ADL

By Molly Upton
CW Staff

IBM Trial Documents

NEW YORK — Profitability from sales of general-purpose computers should increase over the next five years as a result of decreased manufacturing costs and additional revenues from unbundled systems programs, according to a five-year forecast report from Arthur D. Little, Inc. (ADL), a research and consulting firm in Cambridge, Mass.

Systems software should produce "several hundred million dollars/year of incremental revenues," ADL stated in the report, which was introduced as evidence in the U.S. vs. IBM antitrust trial here.

The net value of U.S. general-purpose computer shipments — or shipments less returns — should go from $6 billion in 1976 to either about $4.3 billion or a little over $6 billion in 1981, the report forecast.

Gross shipments are projected to rise from about $7.7 billion in 1976 to between $8 billion and $10 billion in 1981. A peak should occur in 1978 and the lowest point be reached in 1979, when a recession is expected.

Most Makers Constant

IBM's market share should grow to between 67% and 70% of the worldwide installed based compared with its 66.9% in 1976, according to the report.

Univac's share could drop from 8.4% to between 6% and 7% in 1981. However, the report noted, after 1981 it could well rise again, reflecting the firm's tendency to introduce its products late in the industry product cycle.

Other makers' shares should remain relatively constant, according to the report.

Honeywell Information Systems may be in a good position to increase its market share because of its strong position in such high growth markets as Europe and Japan, ADL indicated.

But HIS' potential for significant profit increase is hampered by the high costs it incurs by supporting multiple product lines, the report continued. Digital Equipment Corp.'s market share is more likely to remain the same than grow because of the intensifying competition, including IBM, in the OEM mini arena.

Also, the other large manufacturers are "steadily improving their offerings in Digital Equipment's end-user market areas," ADL said.

Control Data Corp. may experience some erosion of market share from 3.3% to between 2% and 3% as a result of "heavy competition and a limited potential market" for large scientific machines, according to the report. NCR may be able to maintain or increase its 1976 share of 2.3%.

Both these firms "should find their present positions viable throughout the period," ADL stated.

The report assumes a real growth in the gross national product of 3.5%/year in the U.S., 3%/year in Europe and 5% in Japan. It also expects a recession during the 1978-79 period and assumes an inflation rate averaging 4% to 5%/year throughout the period.

No Radical Changes

The concept of distributed minicomputer networks is not going to radically change the entire structure of the data processing industry, ADL contended.

The general-purpose system will "hold its own fairly well, however, until network systems programs are available for handling complex applications in a transparent, integrated manner," the report stated. Suitable systems programs may be five years away, it added.

Shipments of medium computers have been more sensitive to the economy than the small units, the report observed. "Shipments of medium-priced machines will increase substantially in 1977," reflecting a wave of new product deliveries, ADL stated.

The growth will flatten out in 1979, reflecting the anticipated recession and temporary saturation of demand.

The ADL estimates for medium-priced machines ranged from about $2 million to $2.4 billion in 1977 to either $2.3 million or $3 billion in 1981. The sharp growth in the last two years will reflect their use with a new generation of giant machines and also with electronic funds transfer.

A downturn in large system shipments should occur in 1979, reflecting saturation in demand and the recession, ADL said. Shipments should then level off as they face competition from the giant computers.

In 1977, shipments of large systems should be between $1.2 billion and $1.5 billion, jumping to between $1.4 billion and $1.7 billion in 1978. They will then decline by about $500 million in 1979 and then level off at either under $1 billion or about $1.3 billion, according to the study.

IBM 3033 Forecast

ADL foresaw the 3033. The report said IBM would announce a "major new generation" of giant computers early this year which would contribute to a sizable downturn in 1977 giant computer shipments while users evaluated the newcomer(s).

Shipments of giant computers, which exceeded $2 billion in 1976, should dip to between $1.2 billion and $1.5 billion in 1977 and then recover in 1978 to between $1.8 billion and $2.2 billion, ADL estimated.

Flat Year

The following year will be flat, according to the ADL study, but after 1979 shipments should grow to between $2.4 billion and $3 billion by 1981.

Since many of the products will be modular, ADL expects few older units will be returned.

Probably toward the end of the period, ADL forecast, IBM will counter competition with a new operating system. "Most of its subordinate functions will have been separated out into dedicated supporting processors so that only the central scheduler, resource assigner and error manager will need to be changed," the report said.

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Norris: DP Can Aid Society — And Vice Versa

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Data services can become a driving force behind comprehensive solutions to social problems "because they offer availability and flexibility with little or no capital equipment investment by the user," according to William C. Norris.

But the companies providing these services must learn to respond to changing needs, Control Data Corp.'s chairman of the board and chief executive said at a conference here recently.

"More and more those needs are to find solutions to society's major problems as opposed to simply providing a service — and more important for us as businessmen is to turn those solutions into business opportunities," Norris stated.

"Widespread cooperation is essential to that task," he added. "It is also the means not only for the survival of many individual data service companies, but ultimately of our present business system."

Business cannot leave major societal problems unsolved for long, Norris contended. "If it does, society will turn elsewhere for solutions. Therefore, the entire private enterprise system is at stake, he added.

Companies Dwindling

To bring his message a little closer to home, Norris pointed out that between 1965 and 1968 there were approximately 2,000 small data services companies. Today, that number is estimated at 1,400 and by the early 1980s, unless the trend is stopped, it is expected to dwindle to about 800.

The answer is for small data services companies to develop wide-based cooperation among themselves and with large companies and to move toward comprehensive solutions," Norris maintained. This type of business strategy requires more resources, but these can be obtained by sharing facilities and by technological cooperation. This will ultimately reduce needless duplication of effort, he said.

CDC is now using data services and joint ventures to try to improve productivity and quality in education, in management of technology and in health care, he noted, adding all three social needs represent business opportunities.

Educational Projects

Citing CDC's 14-year-old effort with the University of Illinois and the National Science Foundation to develop computer-based education to the point where it would be cost-effective for training in both industry and select ed vocational and remedial courses, Norris said that CDC now has 29 learning centers located throughout the U.S.

By the end of this year, the company will have placed 45 to 50 learning centers in cities across the country, he added. While most courses offered at the centers are now primarily aimed at business, courses in basic skills through a ninth-grade level will be available by December.

"As computer-based education becomes cost-effective for virtually all kinds of education and training, there will be business opportunities for all sizes of service companies," Norris maintained. "Small companies can gain the necessary resources through cooperation with others in sharing equipment and through joint development of courseware."

In the area of technology management, CDC has established Technotec, a computer-based system for communicating the availability of and the needs for various technologies.

Because many technologies are complex and consulting assistance by specialists is required, the corporation has developed a related service, Worldtech, which is an organization of technical, marketing and financial experts willing to assist in all phases of technology transfer, Norris added.

"The approach for data services companies in serving the needs for more efficient management of technology is to assemble the resources necessary to seek out technology for clients and to help in expediting its transfer and application," he stated. "this will require both data services and engineering professionals. Equipment and communications networks can be shared to reduce capital requirements."

Health Care

The problem in health care is not just further advances in health sciences, but also finding a way to disseminate information and to deliver care so that all can afford it, Norris said.

Computers are well-known in administrative areas of health care. They are starting to be used in intensive care monitoring, automation of pathology laboratories and health screening, he pointed out.

"It appears to me that ultimately the most efficient delivery of health care can be made by data services professionals and physicians working together in the same organization," Norris said. "The most important service will be health information related to individual needs and drawn from a vast data base of nutritional information and other medical data," he predicted.

Data services organizations can also find business opportunities in the needs of segments of society. Norris highlighted the possibilities for small businesses and for developing countries.

Lacking abundant capital, small businesses need training in good management practices, technology for new products and alternative business strategies, Norris said. Professional consultants are available in all of these areas, but most small businesses can't afford the fees.

However, with computer-based education and other computer services delivered in combination with professional expertise, greater efficiency can be obtained, resulting in an affordable cost, he stated.

"The needs of developing countries present another important business opportunity for data services companies. Lack of information is probably the single largest deterrent to the economic development in those countries," Norris suggested.

"Once information is available, the next step is using it efficiently, and that means the gamut of computer applications," he said. Cooperation in the form of joint ventures between small to medium-sized companies in the industrial countries and organizations in the developing couuntries is an important part of the answer, Norris stated.

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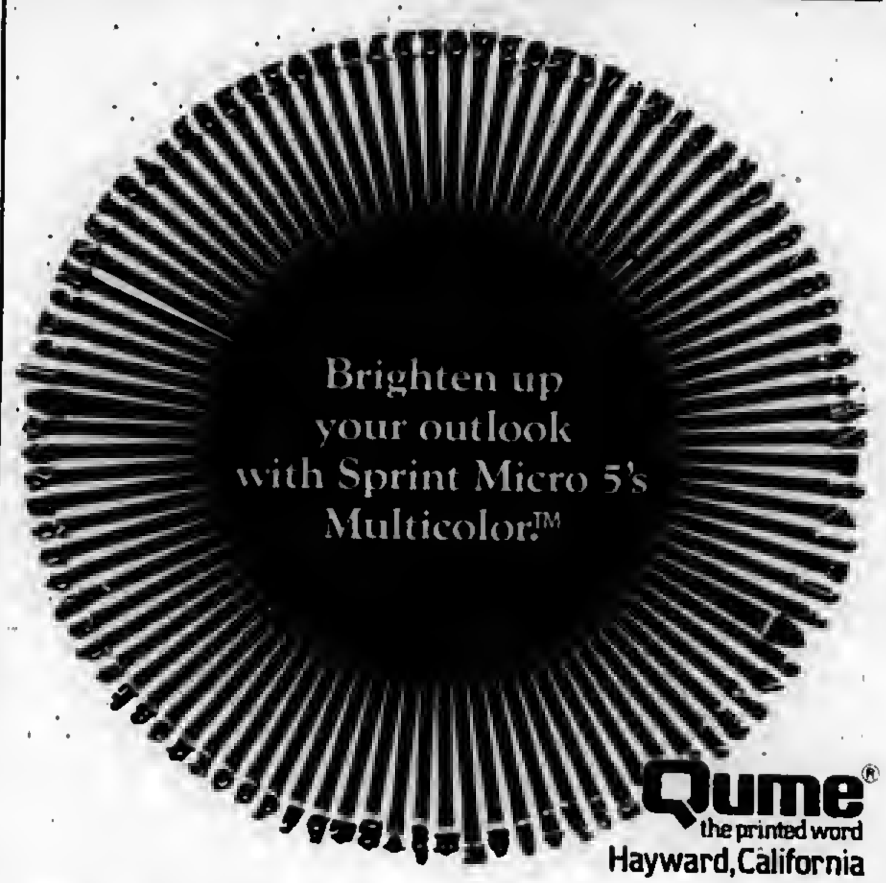

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Executive Corner

• Henry W. Weiss has joined Okidata Corp. as director of domestic marketing.

• James W. Duplex has been promoted to vice-president of the Customer Servica Department at Bunker Ramo Corp.'s Information Systems Division.

• M.C. Abramson has been named senior vice-president for finance and support operations at Remote Computing Corp.

• Gary M. Kaner has been promoted to vice-president for manufacturing at Carterfone Communications Corp.

• James G. Wyllie has become corporate controller of Comshare, Inc.

• Dr. Gian F. Raffo has been named vice-president of Inforex, Inc.

• Michael G. Muller has been appointed vice-president/-controller and Dan L. McGurk has been elected to the board of directors at Data Processing Power.

• Paul Schwartz has been appointed vice-president and general manager of Integrated Microsystems, Inc.

• John H. Woodley has become vice-president for manufacturing of Micropolis Corp.

• Roland E. Welch, Edward T. Harlyvetch, Roy C. Oakford and Thomas Skadeland have been appointed vice-presidents of Scan-Data Corp.

• Joe Cattorini has been named vice-president for engineering of Documation, Inc.

• Herbert T. Hensley has been promoted to vice-president for International Operations at Datapoint Corp.

• Frank Carr has been appointed commissioner of the U.S. General Services Administration's Automated Data and Telecommunications Service.

• John F. Watters has joined Pharm-Assist, a subsidiary of Synergex Corp., as president.

• Lewis C. Kasch has been named group vice-president for U.S. sales and international operations and Eberhard C. von Clemm has been appointed vice-president and manager of international operations at Tektronix, Inc.

• Ray Lappegaard has joined Data 100 Corp. as vice-president.

• Martin Duhms has been appointed vice-president for sales and marketing at Lexidata Corp.

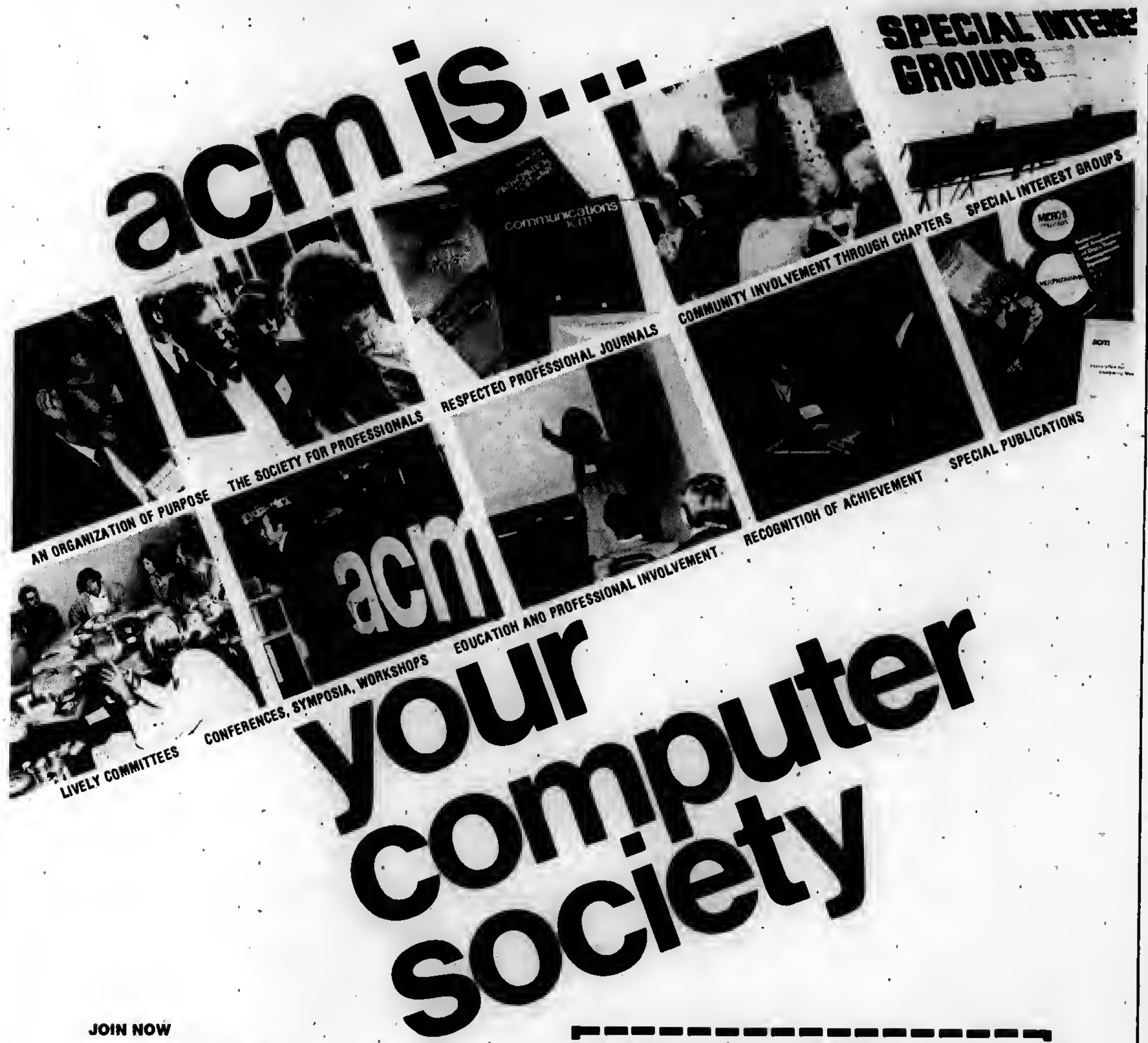
• Karl E. Hayden has been named president of United Computer Services International Co.

• Eric Krause has become executive vice-president for marketing and Pete Stulik has been promoted to vice-president for manufacturing at Dynatch Corp.

• Larry L. Krummel has been appointed vice-president of software development at Ramtek Corp.

• E. Terence Bradunas, Gerald L. Dennison, Peter J. Kolgen and Eric C. Frankel have been named technical directors of Data Technology Industries, Inc.

• W.D. Warren has joined Datapoint Corp. as vice-president of engineering.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COMPUTERWORLD

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Computer Sales

We've got what it takes to help you make an easier close!

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Find out now how Interdata's total support policy can increase your earnings and bring you greater satisfaction through easier closings, by contacting the District Sales Manager nearest you:

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Chicago District Sales Manager
Interdata Pavilion
415 W. Golf Road
Arlington Heights, Ill. 60005
(312) 437-5120

Pat Tomlin
Dallas District Sales Manager
13771 N. Central Expressway
Suite 624
Dallas, Texas 75243
(214) 234-8880

Darwin Weir
Cleveland District Sales Manager
195 Alpha Park
Highland Heights, Ohio 44143
(216) 461-8344

INTERDATA®
A UNIT OF
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Equal Opportunity Employer M F

Program Support Representative

Systems programming or maintenance background on IBM 360/370 essential

If you are experienced in debugging, programming or maintaining operatings systems on medium or large-scale IBM 360 or 370 computers, consider the sensible career alternative – Itel. Opportunities are available in White Plains, New York, Chicago, Illinois and Dallas, Texas.

You'll join a field force of more than 500 who have helped us build our reputation as a leader in total computer capability. You'll provide professional guidance and service to our customers on all IBM operating systems – OS/MVT, MFT; OS/VSI, OS/VS2 (SVS & MVS), DOS/VS and VM/370. And you'll work with the Advanced System, Itel's more powerful, more efficient and more reliable alternative to the IBM 370.

Because we're a young, dynamic organization, your opportunity for advancement is as great as the market for our Advanced System. Add to this a comprehensive benefits and compensation package and you have several good reasons to move to Itel.

Qualified candidates are invited to send a resume to Itel Corporation, Field Engineering Division, Attn' Janice Criddle, Personnel Department, 3145 Porter Drive, Palo Alto, CA 94304. (415) 494-7900 extension 443. An Equal Opportunity Employer M/F.

ITEL CORPORATION
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Top Salaries in the Sun Belt for D.P. Pro's

Enjoy year-round golf, beaches and relaxed lifestyle. All fees assumed by our client companies. Prime S.E. & Coastal locations. Contact us in confidence.

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AVAILABILITY, INC.
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COMPUTER OPERATIONS/ COMMUNICATIONS CHIEF

A small company engaged in high technology research for DoD and civil agencies needs an operations chief for its computer system. The system consists of PDP 11/45, soon 11/70, with heavy in-house usage, continuous remote communication to CDC 7600, sporatic communications to other sites and remot points. The position carries strong daily operational responsibility and authority with minimal software development responsibility. The chief must be capable of understanding PDP and communications hardware and software, dealing with 30 users at all levels of sophistication, dealing with vendors and customers. Salary $25,000 to $30,000 depending on experience. Send resume with references to:

Personnel
Mission Research Corp.
P.O. Drawer 719
Santa Barbara, CA 93102
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programmers

Diagnostics Programmer

We are growing in all areas of our company because we are enjoying a worldwide increase in demand for our products and services. We believe we have a lot to offer good people who are ready to take a positive step toward upgrading their careers and work environment.

We have an immediate need for a Software Programmer to join us in our commitment to state-of-the-art diagnostics of large computers. You will design and develop diagnostics software for the CPU, channel and memory systems. You should have experience with high level languages, digital logic and computer systems as well as a BSEE or CS or the equivalent experience. Qualified candidates are invited to reply by indicating 435-E on their response and directing it to Employment Manager, Amdahl Corporation, 1250 East Arques Ave., Sunnyvale, CA 94086. We are an equal opportunity employer.

amdahl

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Are you better than your present job?

Are you one of those people who fell into a pretty good job? With pretty good pay? With a pretty good company? And you're rocking along okay... but you *could* be doing a lot better. Consider a change to TI. We offer lots of challenge and outstanding opportunities to people who can prove their value. Positions require a bachelor's degree and U.S. citizenship.

IBM/370 Programmers

Requires experience on IBM/370 using COBOL/ALC working with IMS/DL 1 data base systems.

Systems Analyst/Project Leaders

Requires detail design and implementation of hierarchical data base systems to support engineering, production planning and control, materials management, shop floor control, and factory automation.

Computer System Engineer

M.S. or PhD in Electrical Engineering or Computer Science and 5 years' experience in hardware and software design of real-time computer systems.

Communication Network Engineer

Engineering or Scientific degree with 3-5 years' experience in the communication field with emphasis on data communications.

Software System Designer

M.S. in Computer Science or Engineering and 5 years' experience in design of software systems for real-time and interactive systems.

Programmers

B.S. in Computer Science, Math, Physics, Engineering or Business and programming experience with higher order languages such as Fortran, COBOL, PASCAL, or PL/1. Both scientific, business and real-time programmers are needed. Openings for these positions are in Dallas, Texas.

Minicomputer Programmers

Requires experience on 16 bit mini's using Fortran or Assembly languages working on data base management, communications, factory automation, interactive graphics and computer aided design.

Engineering System Analyst

Requires MS or PhD in math, physics, computer science or engineering, with experience in analysis of engineering systems.

Send your resume in confidence to: Staffing Manager/ Equipment Group/P. O. Box 6015, M.S. 222/Dallas, Texas 75222.

TEXAS INSTRUMENTS
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PROGRAMMERS!

Are you interested in enhancing your career as a computer professional, as well as relocating to the warm, sunny climate on beautiful San Diego Bay? We can offer you both!

Immediate requirements exist for:

SYSTEMS DESIGNERS
APPLICATION PROGRAMMERS
IMS SYSTEMS/SOFTWARE PROGRAMMERS

All experience levels are needed to work on large scale data base/data communication systems in a 370/168 environment using IMS, COBOL and Data Dictionary. Selected candidates will develop comprehensive manufacturing control systems including MRP, Cost Accounting and Data Collection. Exposure to structured design and structured programming an asset.

Rohr Industries, Inc. is a major Aerospace manufacturing firm located in Chula Vista, California. We provide excellent fringe benefits, competitive salaries and relocation assistance to selected candidates.

Please mail resume to:

ROHR
INDUSTRIES, INC.

Professional Placement Dept., 15-G
ROHR INDUSTRIES, INC.
P.O. Box 878
Chula Vista, CA 92012

An Equal Opportunity
Employer M/F/H

Software Design

Telecommunications Applications

At BNR, the second largest privately-owned R&D organization in the western hemisphere, we are seeking exceptional software engineers and managers for our growing Palo Alto (San Francisco Peninsula) laboratory, where we are conceiving and pioneering the development of computer controlled voice and data business communications systems which define the state-of-the-art. These advanced EPABX systems projects, utilizing stored program control, involve high-level languages and structured design/programming.

Opportunities currently exist in the development of:

- **Special purpose operating systems**
- **Call processing software**
- **Maintenance and diagnostics**
- **Data administration**

The positions listed below require at least a BS in CS, EECS, or Math; recent related experience in telephone switching systems, telecommunications, or real-time control; and competence in current software engineering technology.

Software Managers

Supervise software engineers in the development of real-time systems. Requires management experience.

Chief Programmers

Lead programming teams in large-scale software system design and development, including development of key system modules and software specifications.

Software Engineers

Design, implement and test large-scale software systems components as part of a development team.

We offer excellent compensation; one of the best benefits programs in the U.S., full relocation assistance, a progressive and stimulating environment and outstanding opportunities for personal recognition and professional growth.

For prompt consideration, send your resume to Tom Lovejoy, Recruiting Manager, BNR INC., Mail Stop 149, 3174 Porter Drive, Palo Alto, CA 94304. An equal opportunity employer, m/f.

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The R & D Laboratory for
Northern Telecom and Bell Canada

Computer Professionals. $15-$35,000+.

You can grow with one of the nation's top 10%. Attend Source Edp's new:

CIM/77

Call today 1-800/821-2270, X505

If you're like many people in today's highly dynamic and often frustrating computer profession, you may have become confused as to whether you're currently in the best position to meet your career objectives. Each week and month, literally thousands of new position openings are advertised in major newspaper and computer trade media across the country. Head-hunters of all sorts are touting the benefits of their clients with greater fervor (and perhaps exaggeration) than ever before. The demand for computer professionals is so high that some organizations are offering substantial cash "bonuses" just to get you to work for them. If you're confused, it's no wonder. Anyone would be. Source Edp now offers you a new program that will clear the air. We call it CIM/77 which stands for Career Improvement Month — November 1977. CIM/77 is a unique program designed to give you the impartial information you need to evaluate today's complex maze of career options in the computer job market. It allows you to scrutinize in detail the opportunities currently existing within the organizations we feel to be in the upper 10% in the nation. And, you can gain this vital information in a matter of hours while maintaining complete confidence.

CIM/77 is one of the most unique career planning programs ever developed for computer professionals.

CIM/77 participating organizations.

Source Edp has made special arrangements with 527 organizations to participate in our special CIM/77 program. In our judgement, these firms represent the elite in terms of providing hardware/software sophistication, challenging job assignments, personal development programs, rapid advancement potential, favorable working environments and compensation (starting salaries range from $15-$35,000 plus, in some cases, additional bonuses or special performance awards). Those participating in CIM/77 have been drawn from every part of the country. They include computer users in all industries, computer services/consulting firms and computer mainframe and peripherals manufacturers. Their sizes vary from relatively small, rapidly growing firms to some of the nation's most well known and regarded organizations. The total gamut of job content for professionals in programming, systems and software is available with emphasis on opportunities in advanced data base, data communications, distributed processing and new information systems development projects. Many offer formal training programs in both technical and management development. In total, over two thousand positions are available within CIM/77 participants — and you can confidentially evaluate each and every one.

One call or visit to Source Edp gives you inside information on the nation's top 10% and where you might fit in.

Here's how CIM/77 works.

CIM/77 company participants have worked closely with Source Edp to develop detailed job descriptions covering all of their planned openings for November, 1977. Each description reviews initial assignments and qualifications desired, indicates your likely career path (or in many instances multiple career paths), how long it might be expected to reach your goals, the kinds of assistance in the form of training and exposure provided, a complete synopsis of all planned hardware, software and applications and compensation levels at each step along the way. These descriptions involving all 527 CIM/77 participants are available for your perusal at each of Source Edp's 34 branch offices in North America. If you qualify as outlined below, you may review them at your convenience between now and November 30, 1977. (Even if you don't reside in a Source Edp based city, we'll be happy to provide you with this information by telephone). By participating in CIM/77 you'll be able to learn what the computer job market is really like and compare your current position with thousands of others on a local and national basis. And, if you find unique situations that better suit your career objectives, Source Edp is in a position to make discreet contact and follow-up for you. Of course, there is no charge to you since our clients assume all of our fees and other expenses.

Who should participate in CIM/77?

CIM/77 has been specifically designed for computer professionals having at least one to seven years of experience in programming, software, systems development and/or marketing support ranging upward in responsibility to project management. More importantly, the CIM/77 program will have greatest benefit to those professionals who are truly concerned with maximizing their career potential, desire the broadest possible exposure and seek the challenge of rapid advancement.

Your registration in CIM/77.

To take advantage of CIM/77, simply call the Source Edp office nearest you during normal working hours or use our special toll-free number, 1-800/821-2270, extension 505, which will be open twenty-four hours a day, seven days a week through the end of November. (Missouri residents please call 1-800/892-7655). One of our professional staff (each of whom has had extensive computing experience prior to joining the firm) will find out something of your background and career interests and then make a specific appointment for you to review the CIM/77 job description file at your private convenience. (Please note that evening and Saturday appointments are welcome.)

In all, CIM/77 allows you to review over 2,000 specific new position openings — in complete confidence.

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Atlanta 404/325-8370
Boston 617/482-7613
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New York 212/738-7445
Philadelphia 215/665-1717
Stamford, CT 203/329-8411
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Oak Brook, IL 312/986-0422
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Oakland 415/444-5955
Palo Alto 415/328-7155
San Francisco 415/434-2410
Seattle 208/454-6400
Torrence, CA 213/540-7500

Canada
Toronto 416/384-2919

If unable to call, write:
Source Edp
Corporate Headquarters
Department CIM/77-2
721 Enterprise
Oak Brook, Illinois 60521

(Please be sure to indicate home address, telephone and position title.)

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Match Your Growth Rate To Ours!

Come grow with On-Line Systems, Inc., the company where people make the difference. In just ten short years we've grown from a small timesharing company with one Pittsburgh office to a computer services company with over $16 million in revenues, offices in 18 cities in the United States and abroad, and stock traded over the American Stock Exchange.

Right now we're looking for the special kinds of people who have made us what we are today—people with an unusual combination of skill and versatility that bring innovative solutions to customer problems.

Our technical and marketing people work hand in hand in a professional environment that's charged with enthusiasm.

Programmer Analysts. Today openings with uncommon potential exist for Programmer Analysts at all levels—junior, intermediate and senior. You should have a background in FORTRAN with date base management experience, or other programming languages, plus the desire to respond personally and professionally to our customers' needs.

Marketing Representatives. With the support of our technical consultants, you will be responsible for marketing On-Line's services to a wide range of customers. You should have a demonstrated track record in sales and marketing with other time sharing companies, or be a technical consultant with a yen to move into sales.

These positions exist in our Pittsburgh, Atlanta, Washington, D.C., Clifton (NJ), Philadelphia, and New York offices, as well as many other major cities across the country.

If you're an innovative, enthusiastic professional who wants to work where *your* ideas are valued, we urge you to talk to us. Please send your resume, including salary history, in confidence to: Wallace A. Conway

On-Line Systems Inc.

962 Wayne Avenue, Silver Spring, MD 20910
An equal opportunity employer, M/F.

Our People Make the Difference.

PROGRAMMERS AND ANALYSTS

Let us offer you our professional expertise in finding the "RIGHT" position and company.

Our individualized search will provide you with local or national exposure depending on your geographical preference.

If you have at least 2 years experience in programming, send your updated resume, geographical preference and salary requirements in strictest confidence to

SEARCH E.D.P., INC.

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13773 N. CENTRAL EXPRESSWAY
SUITE 1305
DALLAS, TEXAS 75243

SEARCH E.D.P., INC.
SUITE 25, 3181 LINWOOD AVE
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DATA PROCESSING PROFESSIONALS

Due to recent internal expension, Lannox Industries Inc., e nationally racognized laeder in tha haating and air conditioning field, has positions availebia for Systams Analysts, Senior Applications Programmars end Applications Programmers.

Processing anvironment is a 370/158 undar OS/VS1 providing raal tima and batch talaprocessing sarvices for many locations throughout tha United States and Canada.

These positions offar a competitiva compansation and benafit package and excallent opportunity for growth.

Plaase submit a resume which includes salary history to:

John Dugen
Lennox Industries Inc.
200 S. 12th Avenue
Marshalltown, Iowa 50158
An Equal Opportunity Employer

INTERNATIONAL INFORMATION SYSTEMS PLANNER

Spanish and English Required

Base Salary $30,000 Plus Stock and Bonus

We are the exclusive representatives for this Fortune 500 Consumer Product Manufacturing Corporation. We have been asked to locate an individual who will visit and review OP operations and systems within fifteen foreign affiliates worldwide; develop and maintain profilas regarding OP equipment, plans, systams and budgets; work with International staff in developing standard application. Candidate must have international community experience as a planner or systems manager. Position requiras 40% travel.

3780 Whitney Ava.
Hamden, Ct. 06518
(203) 288-7461

Paid travel and relocation expenses. Our clients are equal opportunity employers. Call or write in confidence, Toby S. Brimberg

BREEN DATA
Division of the Breen Group Inc

BOEING

CAD/CAM Specialists

The Boeing Company in Seattle, Washington is seeking CAD/CAM specialists to support the development and operation of sophisticated industrial computing applications in an interactive graphics/distributed network systems architecture. Experienced CAD/CAM specialists are needed in the following areas:

- **Scientific Data Base and DBMS Design**
- **Engineering/Manufacturing Data Base Administration**
- **Systems Architecture and Communications Networking**
- **Distributed Computing Systems Specification and Development**
- **2-D and 3-D Interactive Graphics System Development**
- **Systems Configuration Control Management**
- **CAD/CAM Systems Operation and Support**
- **Systems Testing and Certification**
- **Geometric Systems Research and Development**
- **Master Dimensions (Lofting) Systems Development and Support**
- **Advanced Numerical Control Methods**
- **Engineering Technology Systems and Applications Programming**
- **CAD Systems Development Management**

Candidates must have a BS degree or higher in Engineering, Computer Science or Mathematics and a minimum of three years experience in the development or application of scientific computing systems.

Attractive salary, fringe benefits and moving allowances will be offered selected candidates. And, living is a pleasure in the unspoiled Northwest with its many recreational and sports activities and relaxed life-styles.

Send your résumé to The Boeing Company, P.O. Box 3707-BKK, Seattle, WA 98124.
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BOEING
Getting people together

PROGRAMMERS

BUILD YOUR CAREER ON OUR MINI!

Sperry Univac, manufacturers of the V-77 Family of high performance mini-computers has several career openings in Systems Marketing for individuals with the following expertise.

COMMUNICATIONS PROGRAMMING

Programmers/ Sr. Programmer Analysts

The position requires a minimum of 6 years communications experience in the design and use of transaction oriented systems and distributed processing. Knowledge of various communications protocols - synchronous and asynchronous (BSC, SDLC, etc.), a must. Mini-computer background, assembly language and one or more higher level languages desirable. (Dept. CWS-20).

APPLICATIONS PROGRAMMING

Senior Programmer

A thorough understanding of mini-computers with experience in applications programming on industrial, special commercial, or telecommunications systems. Applicants must be capable of producing detailed design from functional design specs and must be knowledgeable in one or more assembler and high level languages. BS degree or equivalent and at least 3 years of related experience is required. (Dept. CWS-21).

Sr. Programmer Analyst

Individual must have a depth of experience in systems and applications programming of mini-computers on Industrial or special commercial, multi-tasking transaction-oriented systems. Understanding must include several computer systems (with their assembly languages and operating systems), two or more high level languages, and the use of telecommunications. The successful individual will be assisting with proposals, generating functional and detail design specs, and estimating software development costs and schedules based only on gross problem definitions. The ability to conduct design reviews is a must. BS degree or equivalent and minimum 9 years related experience including project management. (Dept. CWS-21).

Programmer

This is a growth opportunity for a programmer with experience in mini-computer applications in at least one language. Candidates must have the ability to code, debug, and document programs by interpreting and following detail system design specs. BS degree or equivalent experience is desired. (Dept. CWS-21).

SPECIAL SOFTWARE

Sr. Programmer Analyst

Minimum 4 years experience in assembly languages, FORTRAN and COBOL. Real-time Systems Programming required. Additional experience in Data Communications and/or Diagnostics desirable. BS degree or equivalent required. Hardware/software knowledge in drivers, handlers, special interfaces, etc., helpful. (Dept. CWS-22).

We offer an excellent salary and a comprehensive benefits package that includes free dental insurance. Please direct your resume and salary history in confidence to Personnel, indicating the appropriate department number on the envelope.

SPERRY UNIVAC
COMPUTER SYSTEMS

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, Ca. 92713
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INFORMATION SYSTEMS PROFESSIONALS

Royal Trust is embarking on an exciting phase of redesign of our major applications with the prime objective of fulfilling our users' requirements well into the 80's.

The environment we are creating will include a nationwide network enabling all our branches on-line access to our banking, financial and corporate applications, hosted by a IBM 3033. Consideration is also being given to the company's international requirements.

WHO ARE WE LOOKING FOR?

To fill the range of openings we are seeking:
— some of the best **Systems** and **Programming** people in the business
— **or,** those who despite limited experience demonstrate superior potential

Successful candidates will be enthusiastic about the use of technology over the next decade, they will also be a combination of logical thinkers and businessmen. They will be capable of applying computer technology to produce the most effective business solutions.

WHAT ARE WE OFFERING?

We are offering a work environment with:
— receptive management
— progressive responsibility
— small teams
— a range of business and financial applications
— the opportunity to take applications from feasibility through implementation
— innovative "functional" approaches to Systems and Programming
— a technical environment which currently includes ADABAS, CICS, JES3, MVS, TSO.

QUALIFICATIONS

These positions require a combination of experience in any of the following:
— user oriented systems analysis
— business and financial systems
— facilities and techniques in the user/computer interface area
— computer system design
— program design
— COBOL (2 years)
— use of DBMS or TP monitor
— OS/VS

If you feel you can successfully fill one of these challenging positions (which will be located in Ottawa), please send your resumé in confidence to:

D. AHARONIAN
Personnel Officer

Royal Trust

630 Dorchester Blvd. West, 6th Floor
Montreal, Quebec H3B 1S6

SYSTEMS/ ANALYST

$1395-1695 per mo.

Req. two years of data processing exp. with emphasis on system analysis; knowledge of principles, methods and techniques of system analysis and design. Knowledge of principles and practices of electronic data processing including computer programming techniques.

Apply: Yolo County Personnel Dept., Courthouse, Room 102, Woodland, CA 95695. PH: 666-8386.

Final filing date:
Oct. 28, 1977- 5 PM

An Equal Opportunity
Affirmative Action Employer

MEDICAL INFORMATION SYSTEM DEVELOPMENT

PROGRAMMER/ANALYST

A Research Institute at the Indiana University Medical Center (Indianapolis) is seeking a bright and dedicated Programmer/Analyst to join in the development of a medical information system with national significance. Work involves networking, transaction processing and the development of an in-house data base system and an automated medical decision-making system. Applications extend to the clinical lab, the pharmacy, the medical record and the operation of the medicine clinics. Opportunity for strong interaction with users and responsibility for major application systems from design through implementation.

Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11 RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

Salary depends upon qualifications and experience. Please send resume (if possible, transcript) to Mrs. Joanne Lepper, 1001 West 10th St., Indianapolis, Indiana 46202.

An equal opportunity employer M/F

Engineering Professionals

Dallas & Ridgecrest, Cal. Openings

Are you better than your present job? Are you one of those people who fell into a pretty good job? With pretty good pay? With a pretty good company? And you're rocking along okay... but you could be doing a lot better. Consider a change to TI. We offer lots of challenge and outstanding opportunities to people who can prove their value.

All openings require a minimum of a Bachelor's degree and U.S. citizenship.

Software Engineers
Application and Assembly language programmers are needed for implementing control, signal processing, and autopilot algorithms.

RF Engineers
Engineers required in all microwave disciplines including antennas, receivers and microwave components.

Field Engineers
Will support evaluation testing of weapon systems and subsystems. Specialized experience in software/hardware design or microwave useful.

Design Engineers
Openings for all disciplines including:
- Mechanical/Structural
- Analog
- Digital

System Engineers
Will provide conceptual design definition for a wide variety of systems and subsystems.

Analysts
System analysts to work with system engineers in trade-off analysis to support system concept and definition.

Send your resume in confidence to: Staffing Manager/
P.O. Box 6015, M.S. 222/Dallas, Texas 75222.

TEXAS INSTRUMENTS
INCORPORATED
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IMS DISTRIBUTIVE PROCESSING

Expanding from IMS/VS DB to full IMS/VS DB/DC. Opportunity to get in on the ground floor. Distributuve processing our goal. Resources available: 370/158, 3790, MVS and NCP/VTAM. IMS/VS DB/DC release 1.1.4 currently on order.

IMS DATA BASE DESIGN SPECIALISTS

Responsibilities will include Data Base design, data dictionary maintenance; Data Base performance monitoring and tuning, and technical support.

The successful candidates will have extensive IMS/VS DB experience. Working exposure with the DC facility. Knowledge of JCL and COBOL with MARK IV a plus.

IMS SYSTEMS PROGRAMMERS

Responsibilities will include systems generation and maintenance, system performance monitoring and tuning, and error identification and debugging.

The successful candidates will have extensive IMS/VS DB/DC internals experience. Working exposure with MVS. Knowledge of NCP/VTAM, 3790, and/or SMP a plus.

We offer excellent salaries, benefits and growth opportunities. Send resume including salary history in strict confidence to: J.R. Brune, Amtrak, 955 L'Enfant Plaza SW, Washington, D.C. 20024.

An Equal Opportunity Employer M/F

Amtrak

SYSTEMS SOFTWARE SPECIALISTS

GTE in Mt. Laurel, New Jesey, invites you to join a top-notch team developing one of the largest on-line information systion systems in America.

We're offering you a whole lot more than just a job. If you're an aggressive professional with experience and ability, we're offering you the genuine chance to move your career ahead a full notch or two — in level of work, and financial reward. Right now, we're seeking . . .

OS/VS systems programmer with communications experience. CICS and NCP with BI-SYNC and SDLC in an SNA environment are required.

You'll be concentrating on NCP internals . . . 370 system programming in support of NCP . . . specifying and developing local and remote network control software . . . and custom communication interfaces.

OS/VS1 system programmer with internals experience. Your initial responsibilities will include VS/1 maintenance and tuning . . . training junior systems programmers . . . and operating system evaluation. You will then move deeply into operating system internals for specialized development in the areas of inter-partition communications, task management, storage management, input/output supervision, and access methods.

Both these positions require a BS or MS degree in Computer Science and appropriate experience.

Senior programmer/analysts . . . professionals able to take general systems specifications and develop them through to implementation. You'll work on a worldwide brokerage network and related financial systems . . . and must have at least five years of experience in Assembly language programming (IBM 370 and/or other systems) and systems development. You should have knowledge of communications-based systems, message switching, or real time applications. A degreed candidate is preferred. Exceptional experience will be compensated.

If you qualify, please apply by sending your resume, complete with salary history, to: Mr. Thomas J. Lynch, GTE Information Systems, East Park Drive, Mt. Laurel, New Jersey 08057. We're an equal opportunity employer M/F.

GTE
INFORMATION
SYSTEMS

Simulation Language Development

PROGRAMMER ANALYST

A Health Services Research Institute at Indiana University Medical Center (Indianapolis) is seeking a Programmer/Analyst to join in the development of a general Computer Simulation Language with national significance. Work involves language development, compiler design, programming, and applications. Applications extend to medical practice planning, hospital service systems, and health planning/policy analysis. Opportunity exists from major contributions to extending language capabilities and coding implementation to strong interaction with users in application and analysis.
Position requires BS and/or MS in Computer Science or equivalent, with background in data structures, compiler design, and data base management. One to three years of employment as a programmer/analyst desired with FORTRAN and related languages. Experience with computer simulation and operations research helpful but not essential. Salary depends upon qualifications and experience. Please send resume (if possible, college transcript) to Mrs. Joanne Lepper, 1001 West 10th Street, Indianaoolis, Indiana 46202.

An equal opportunity employer M/F

POSITIONS AVAILABLE
NATIONWIDE

Client Companys Pay All Fees
IMMEDIATE NEEDS INCLUDE:

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Because of our client's exceptional growth rate you are likely to achieve the more senior positions which you merit very much faster than with your present organisation. **Some Key Senior Positions are available now.**

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The company recognises that their greatest investment is in their people. Professional training safeguards this investment and ensures that you stay ahead technically and professionally. Training is carried out in both the United States and Europe. You will not fall behind technically, and you will gain personal and business experience which will add to your value as a computer professional.

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DP
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NCR's Terminal Systems Division in Millsboro, Delaware is a high volume manufacturing facility concerned with the design and production of POS terminals. We are currently experiencing substantial increases in Engineering activity and as a result have immediate needs for programmers interested in growth opportunities.

Desired Experience

- Systems
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  - Diagnostics
  - Operating Systems
- Applications
  - Vocationally oriented to the Retail Market
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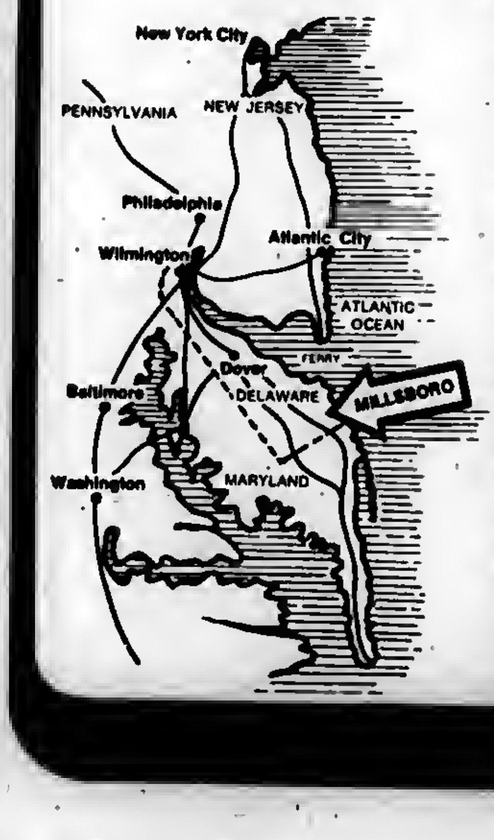

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living." We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches.

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Terminal Systems Division
NCR Corporation
P.O. Box 607
Millsboro. DE 19966

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- PDP 11 Mini-computers
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Experienced in one or more of the following areas would be desirable:

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Manager, Employee Relations
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Lockheed announces challenging career opportunities for qualified computer specialists in areas of hardware evaluation, planning, performance and systems software.

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Qualified individuals will assume high level positions having direct interface with senior company management. Candidates should have a B.S. degree, at least five years in data processing experience, and knowledge of hardware/software systems. Individuals will perform evaluations, direct planning efforts, and manage the performance of current and future computing equipment for the company. Experience with IBM equipment, minicomputers, peripheral hardware, distributed systems, and data communications is desirable. For further information, call Dick South collect at (213) 847-6121.

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You will be a member of a team maintaining the MVS operating system for two IBM 370-16B's which support more than two hundred on-line terminals under IMS/VS, TSO, RJE and interactive graphics. The organization is moving rapidly this year into distributed processing with terminals attached to minicomputers in turn attached to the host 370. IBM 3B50 Mass Storage and 3350's are already installed. Candidate should have at least five years experience in sysgens, installing PTF's, problem diagnosis, and assembly language coding. Most recent experience should be with MVS and prior experience with MVT. Degree in Computer Science is preferred. For further information, call Duane Bickel collect at (213) 847-6121.

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Please write or send resumes to Bill McVeda, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520.

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Leading manufacturer in the San Fernando Valley, California, has an opening for a programmer/analyst with a minimum of 3 years experience to work in IBM 370 DOS/VS CICS environment.

Qualified person must have strong COBOL background with some RPG II experience. Degree preferred. Salary based on experience. Profit Sharing and liberal benefits. Please send resume in confidence to:

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797 Washington St.
Newton, Mass. 02160

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The Dayton areas largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

A bachelors degree in Computer Science plus a minimum of 2 years NCR NEAT/3 or NCR COBOL experience desired. Experience with CIF, CIRF and/or commercial bank applications preferred.

We offer an excellent salary PLUS an outstanding benefits program. If you qualify, send your resume along with salary history to Personnel Director:

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Material Planning— Senior Systems Analyst

Responsibilities to include analysis, development, and implementation of systems to support material planning function at truck assembly and parts manufacturing plants. Requires strong exposure to MRP, bill of material and manufacturing scheduling. Must be capable of leading a major project effort.

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Reporting to the Data Base Administration Manager, data administrator duties will include data relationship analysis, data planning for corporate and IMS usage, and data dictionary/directory usage and management. An IMS systems programming or applications analysis background is desired; working knowledge of UCC-10 is a plus.

On-Line Systems— Systems Programmer

The On-Line Systems Department is responsible for IMS/DC and CICS. Specific systems programmer responsibilities are CICS and IMS gen, maintenance, and performance analysis. Experience in both COBOL and BAL is required; a background in manufacturing systems and MVS is desirable.

Successful applicants will have a proven performance history in a large scale (158/168) O/S or V/S environment. Salaries are competitive, benefits are excellent.

The Corporate office of Freightliner, the hallmark of custom built trucks, is located in Portland, Oregon. Please send resume and salary history in confidence to: **Ms. Adair Weissenfluh, Freightliner Corporation, P.O. Box 3849, Portland, OR 97208.**

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DATA PROCESSING PROFESSIONALS

Townsend and Bottum, Inc., a growing firm in the construction industry, has immediate openings in its Ann Arbor Data Processing Department. Computer professionals with OS/VS1 or DB/DC knowledge are required for Townsend and Bottum, Inc. to continue to meet its fossil and nuclear power plant construction commitments.

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Will work with users in accounting, costing, engineering, scheduling, and estimating departments. Applicants should have three (3) years experience in preparing project definitions, design specifications, user training, and DB/DC software. Strong verbal and written communications skills are necessary.

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Will join a systems programming group responsible for providing technical support to the programming and operations staff. Duties include generation, maintenance, and tuning of operating systems and DB/DC software. Applicants should have three years experience in systems programming with current IBM hardware and software.

OPERATIONS MANAGER

Will supervise the computer operations and systems programming staffs, and provide functional supervision for the remote locations. Applicants should have experience in operations with at least three years of supervisory experience:

Please send resume to the attention of:

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P.O. BOX 1368 ANN ARBOR, MI 48106
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PROJECT SYSTEMS ANALYST

Consortium of Northern Illinois Community Colleges has opening for systems analysts to develop computer programs for libraries. Duties include supervision of project programmers. Must have experience with 370 DOS/VS Operating System, COBOL programming, and familiarity with CICS/VS on-line programming. Phone (312) 697-1000 or write Jack Weiss, Elgin Community College, Elgin, IL 60120. Deadline for notification Nov. 15. An equal opportunity employer.

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Salary commensurate with experience, including complete benefit package. Send complete resume and salary requirements to:

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A demonstrated ability to interface with customers and our sales force is also essential for this challenging position. This is an excellent opportunity for growth in a rapidly expanding commercial market. You will be based in Merrimack, New Hampshire.

If you are interested and qualified, please forward your resume, including salary history and requirements to Fred Arno, Digital Equipment Corporation, Dept. E1024 3807, 129 Parker Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

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We are seeking lead programmers for an advanced data communications project for the PDP-8. You must have communications software experience, and PDP-8 background will be considered useful, but not essential to fill these openings.

PROGRAMMERS

Several experienced assembly language programmers are needed to work on Real-Time Operating Systems and language development. Experience with PDP-8's preferred.

If you are interested in the above positions, please forward your resume including salary history, stating position desired to Joe Hart, Digital Equipment Corporation, Dept. B1016 31807, 146 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

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We offer an excellent salary and benefits program plus growth opportunities with an innovator. To be considered, send your confidential resume to: *H I S c o J. Malone, Personnel Department C, TYMSHARE, Inc., 20705 Valley Green Drive, Cupertino, California 95014. An equal opportunity employer m f*

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SYSTEMS DESIGN ANALYSTS

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To qualify for these outstanding positions, candidates would have e technical or computer science degree. 4-6 years experience in softwere development projects is required. A thorough knowledge of operating systems, assembler languege programming, and real-time concepts ere among the qualifications you would possess.

PROGRAMMERS
(Assembler Language)

We are seeking programmers with a technical or computer science degree plus 2-4 years programming experience. Progremming experience will be in ssembler language.

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Major emphasis will be to prepere the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include 3-5 years systems end programming experience using COBOL in one or more of the ebove-application ereas. Ideally that experience will also include the use of data base and on-line processing.

The ideal candidate will have a bachelor's degree in an appropriate discipline.

To investigate these outstanding opportunities, write to:

NCR
Complete Computer Systems

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PROGRAMMER ANALYST

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Send resume to:

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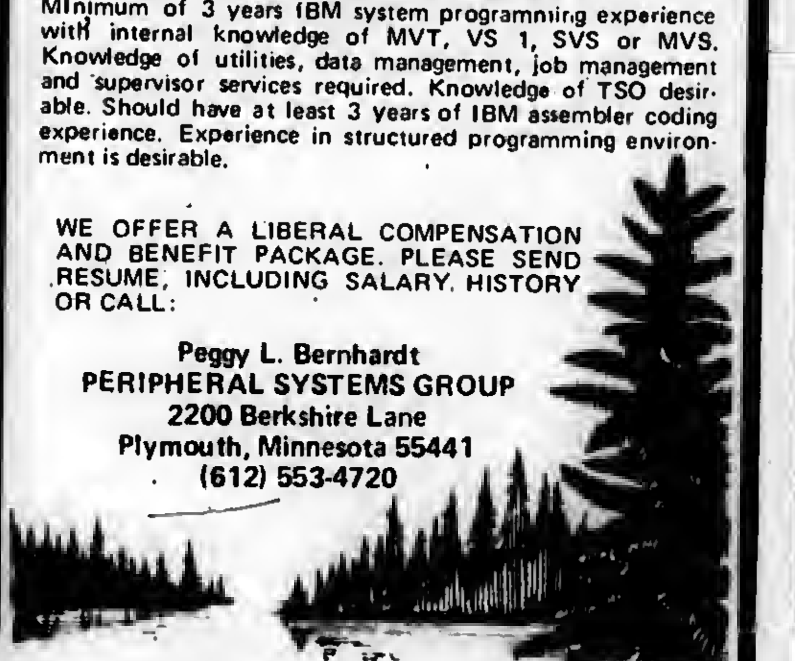

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The University of Oregon Health Sciences Center (located in Portland) seeks to fill the newly-created position of Director of Data Processing. Responsibilities are for systems development and data processing for the Center including University Hospital, instructional and research programs as well as administrative services. The Director will also be responsible for planning of data processing activities, completion of budgets and budgetary requests, recommendation of policy and coordination with cognizant EDP review authorities.

The successful candidate will have at least 10 years of systems/data processing experience, a minimum of 5 years of which have been in positions of progressively responsible management or supervisory positions. Past experience must include direction of major operational data processing projects and implementation/conversion of new applications involving health care applications. Experience must include the development, implementation, and operation of academic and administrative systems in an institution of higher education. Candidates having one or more advanced degree and/or experience in an academic health sciences center will be given preference.

Applications and resumes will be received through Friday, November 18, 1977, by:

Mr. Robert A. Peterson
Vice President for
Administration & Finance
University of Oregon
Health Sciences Center
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Houston, TX 77027
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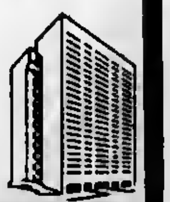

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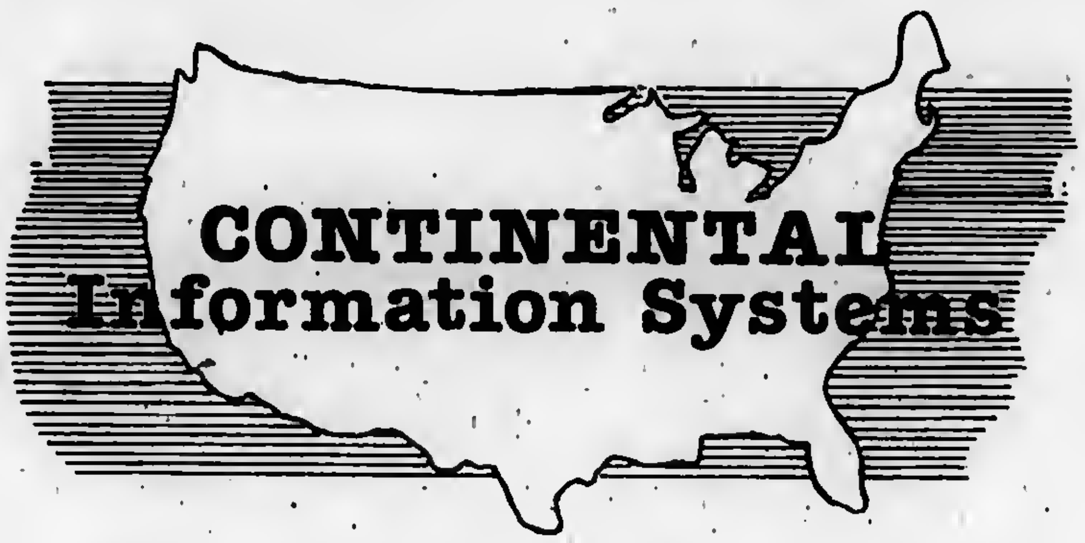

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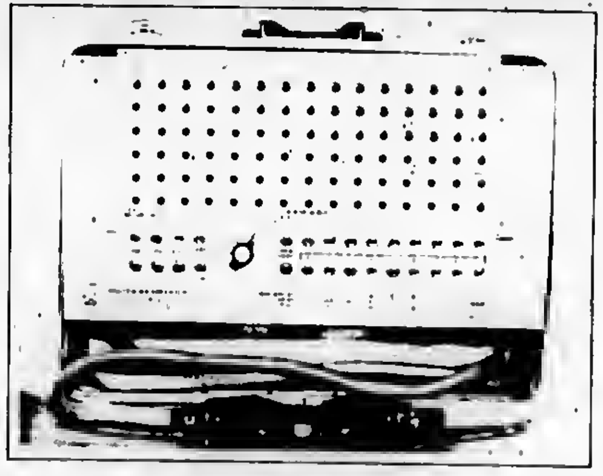

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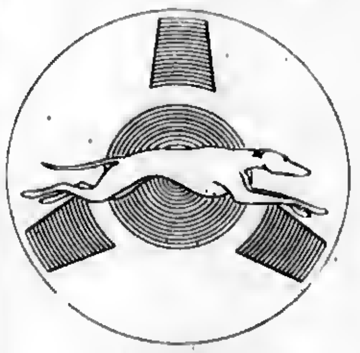

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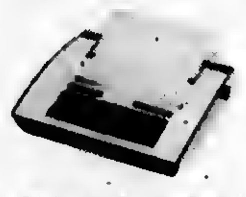

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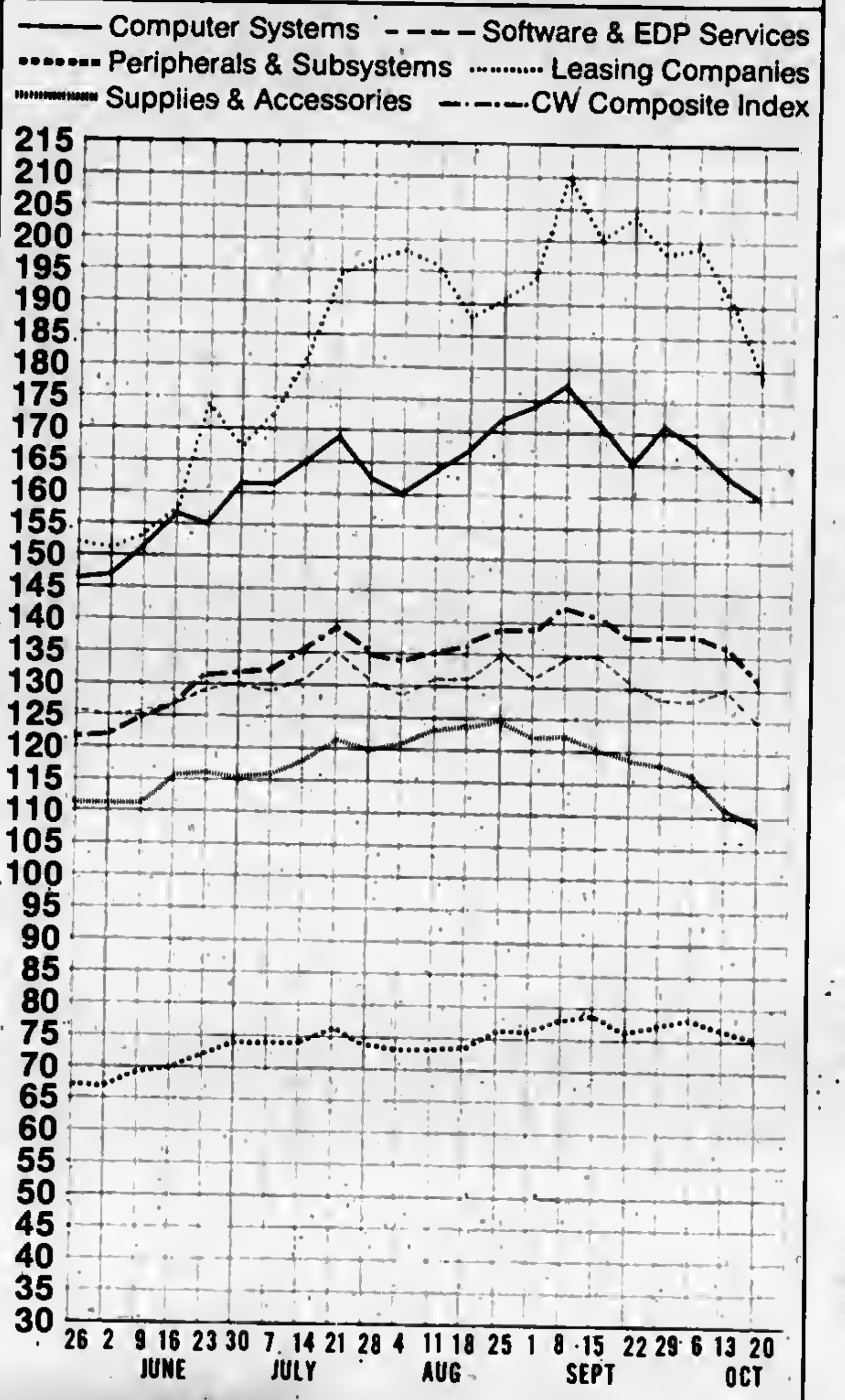

Earnings Reports

COMOISCO
Three Months Ended June 30

	1977	1076
Shr Ernd	$71	$.51
Revenue	18,246,195	22,848,347
Eernings	739,177	515,324
0 Mo Shr	2.11	1.55
Revenue	63,505,363	60,766,099
Eernings	2,189,162	1,733,448

COMPUSERVE
Three Months Ended June 17

	1977	1976
Shr Ernd	$.26	$.21
Revenue	3,460,000	2,303,000
Eernings	301,000	218,000
6 Mo Shr	.56	.42
Revenue	8,668,000	4,660,000
Earnings	642,000	441,000

COMPUTER OATA SYSTEMS
Year Ended June 30

	1977	1876
Shr Ernd	$.27	$.82
Revenue	6,040,900	5,356,000
Earnings	154,000	339,000

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Three Months Ended June 30

	1977	1976
Shr Ernd	$.20	$.22
Revenue	3,017,000	2,640,000
Earnings	326,000	362,000
6 Mo Shr	.36	.36
Revenue	6,005,000	8,312,000
Earnings	819,000	614,000

CONRAC
Three Months Ended June 30

	1077	1976
Shr Ernd	$.91	$.71
Revenue	33,512,000	34,509,000
Earnings	1,936,000	1,462,000
6 Mo Shr	1.67	1.31
Revenue	67,540,000	62,135,000
Eernings	3,581,000	2,607,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 19, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
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COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE OCT 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMOAHL CORP	22- 44	42 1/4	+ 3/4	+1.8
N	BURROUGHS CORP	55- 91	65	- 5/8	-0.9
O	COMPUTER AUTOMATION	18- 30	21	-2 1/8	-9.1
N	CONTROL OATA CORP	20- 26	20 3/8	- 3/4	-3.5
O	C9AY 9ESEARCH INC	15- 29	22	-1 1/2	-6.3
N	OATA GENE9AL CORP	35- 51	43 1/2	-1	-2.2
N	OATAPOINT CORP	18- 32	27 1/4	-1 7/8	-6.4
N	DIGITAL EQUIPMENT	37- 53	43 1/8	-1 3/4	-3.8
N	ELECT9ONIC ASSOC.	2- 3	1 7/8	+ 1/8	+7.1
A	ELECTRONIC ENGINEER.	8- 11	9 3/4	+ 1/4	+2.6
O	FOUR-PHASE STSTEMS	13- 19	16 1/2	- 3/8	-2.2
N	FOXBO90	42- 54	43 3/8	-2 7/8	-6.7
O	GENERAL AUTOMATION	6- 9	6	- 3/8	-5.8
O	GRI COMPUTER CORP	1- 1	1/2	+ 1/8	+33.3
N	HEWLETT-PACKA9D CO	69- 87	71 1/8	-3 5/8	-4.8
N	HONEYWELL INC	43- 55	42 7/8	-1 1/8	-2.5
N	IBM	245-286	256	+ 3/4	+0.2
O	MANAGEMENT ASSIST	5- 9	7	- 1/4	-3.4
O	MEMOREX	23- 34	26 1/2	-4 3/8	-14.1
O	MIC9ODATA CORP	7- 18	11 1/4	- 5/8	-5.2
O	MODULA9 COMPUTE9 SYS	5- 8	6 1/8	- 3/8	-5.7
N	NCR	32- 47	38 3/4	-6 3/8	-14.1
O	P9IME COMPUTE9 INC	12- 23	19 7/8	+ 1/4	+1.2
N	PERKIN-ELME9	17- 22	19	- 1/8	-0.6
N	RAYTHEON CO	16- 33	29 1/2	- 1/4	-0.8
N	SPE9RY RANO	30- 42	30	-1 7/8	-5.8
O	SYCO9 INC	8- 15	11 1/2	- 1/8	-1.0
A	SYSTEMS ENG. LABS	5- 8	7 1/4	+ 3/8	+5.4
A	WANG LABS.	10- 14	12	0	0.0

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE OCT 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	- 1/8	-2.7
O	BOOTHE COURIE9 CORP	8- 10	9 3/4	- 1/4	-2.5
O	COMOISCO INC	10- 13	9 3/4	-2 1/4	-18.7
A	COMMERCE GROUP CORP	1- 3	7/8	- 3/8	-30.0
A	COMPUTE9 INVSTRS GRP	1- 2	1	+ 1/8	+14.2
M	OATRONIC 9ENTAL	0- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2	0	0.0
N	OPF INC	6- 9	7 3/4	- 7/8	-10.1
N	ITEL	13- 22	16 7/8	-2	-10.5
N	LEASCO CORP	19- 27	21	-2 5/8	-11.1
O	LEASPAC CORP	1- 2	1	- 1/4	-20.0
O	N9G INC	1- 1	1/8	0	0.0
A	PIONEE9 TEX CORP	5- 11	5 3/8	0	0.0
N	U.S. LEASING	10- 15	11 7/8	- 5/8	-5.0

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SOFTWARE & EDP SEAVICES

EXCH		1977 RANGE (1)	CLOSE OCT 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECH	1- 2	1/2	- 1/8	-20.0
O	ANACOMP INC	7- 10	8 3/4	+ 1/8	+1.4
A	APPLIED OATA 9ES.	5- 10	8 1/4	+ 1/8	+1.5
N	AUTOMATIC OATA PROC	23- 30	24 5/8	- 7/8	-3.4
O	COLEMAN AME9ICAN COS.	2- 2	1 5/8	- 1/4	-13.3
O	COMPU-SERV NETWO9K	9- 15	9 3/4	+ 1/4	+2.6
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTE9 HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTE9 NETWORK	6- 11	9 1/2	- 1/4	-2.5
N	COMPUTER SCIENCES	7- 9	8 3/8	- 1/8	-1.4
O	COMPUTE9 TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 1/8	- 1/4	-18.1
O	COMSHARE	5- 8	6 1/2	- 1/2	-7.1
O	OATA OIMENSIONS INC	3- 5	3 1/8	0	0.0
O	OATATAB	1- 2	1 1/4	- 1/8	-9.0
N	ELECTRONIC OATA SYS.	14- 20	14 1/4	-1 1/8	-7.3
O	INSYTE CO9P	2- 3	1 1/2	- 1/4	-14.2
O	IPS COMPUTE9 MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4 3/8	- 1/8	-2.7
O	KEYOATA CORP	2- 3	1 5/8	- 1/8	-7.1
A	LOGICON	7- 17	12 1/8	+ 3/4	+6.5
A	MANAGEMENT DATA	1- 2	1 3/8	0	0.0
A	NATIONAL CSS INC	19- 27	24 5/8	- 1/8	-0.5
O	NATIONAL DATA CO9P	4- 7	6 5/8	0	0.0
A	ON LINE SYSTEMS INC	16- 22	16	0	0.0
N	PLANNING RESEA9CH	3- 6	4 1/2	- 3/8	-7.6
O	PROG9AMMING & SYS	1- 1	3/8	0	0.0
O	9APIDATA INC	2- 3	2 1/2	+ 1/4	+11.1
O	REYNOLDS & 9EYNOLD	17- 20	19	- 3/4	-4.0
O	SCIENTIFIC COMPUTERS	1- 4	3 3/4	- 1/4	-6.2
O	TYMSHA9E INC	14- 23	18 5/8	- 1/2	-2.6
A	URS SYSTEMS	4- 5	4 3/8	- 1/4	-5.4
N	WYLY CORP	1- 2	3/4	-	-7.7

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE OCT 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	AODRESSOGRAPH-MULT	10- 15	12 3/4	- 3/8	-2.8
O	ADVANCED MEMORY SYS	7- 9	6 7/8	+ 1/4	+3.7
N	AMPEX CORP	8- 11	9 5/8	+ 1/8	+1.3
O	ANDERSON JACOBSON	3- 5	3 3/4	- 1/4	-6.2
N	APPLIED DIG DATA SYS	10- 20	13 7/8	- 1/2	-3.4
O	BEEHIVE INTL	8- 12	8 1/8	-1 3/8	-14.4
A	BOLT,BERANEK & NEW	7- 9	7	-1 1/8	-13.8
N	BUNKER-RAMO	8- 12	10 1/2	+ 1/8	+1.2
A	CALCOMP	3- 5	3	- 3/8	-11.1
O	CAMBRIDGE MEMORIES	1- 4	3 1/4	-	-1.9
N	CENTRONICS DATA CORP	20- 30	23	-1 1/2	-6.9
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6 1/8	- 5/8	-9.2
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/4	- 1/8	-9.0
O	CONTEN	9- 13	10 1/2	- 1/4	-2.3
N	CONRAC CORP	19- 28	21 1/4	+1	+4.9
O	DATA ACCESS SYSTEMS	4- 5	3 1/2	- 1/4	-6.6
O	DATA 100	6- 9	7 3/8	- 1/8	-1.6
A	OATA P9ODUCTS CO9P	9- 17	14 1/2	- 7/8	-5.6
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	OATUM INC	1- 2	1 3/4	0	0.0
O	OECISION OATA COMPUT	2- 3	2	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 1/4	- 1/4	-3.3
O	OATA9AM CO9P	2- 12	10 1/2	-1 1/4	-10.6
N	ELECTRONIC M & M	4- 5	3 7/8	0	0.0
O	FAB9I-TEK	1- 2	1 1/8	-	-4.9
O	GENERAL COMPUTE9 SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 12	8 1/8	- 1/4	-2.9
N	HA99IS CORP	28- 39	37 7/8	- 5/8	-1.6
A	INCOTE9M CORP	10- 16	16	+ 1/4	+1.5
O	INFOREX INC	4- 7	4 1/2	- 1/8	-2.7
O	INFORMATION INTL INC	9- 14	10 1/2	- 1/2	-4.5
O	INTEL CO9P	38- 57	42 1/2	-2 1/2	-5.5
A	LUNOT ELECT9ONICS	3- 6	4 1/2	- 3/8	-7.6
O	MSI DATA CORP	6- 13	12 1/4	0	0.0
N	MOHAWK DATA SCI	5- 8	5 3/4	- 1/8	-2.1
O	PEN9IL CORP	2- 5	3 7/8	0	0.0
A	PERTEC CORP	7- 9	8 5/8	0	0.0
A	POTTE9 INSTRUMENT	2- 2	1 3/4	0	0.0
O	P9ECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 5/8	0	0.0
O	9ECOGNITION EQUIP	6- 10	7 1/2	+ 1/8	+1.6
O	SCAN OATA	1- 2	1	0	0.0
O	STORAGE TECHNOLOGY	10- 18	15 3/8	- 1/2	-3.1
O	T BAR INC	7- 13	12 1/8	- 3/8	-3.0
O	TALLY CORP.	4- 6	3 5/8	- 1/8	-3.3
A	TEC INC	7- 10	7 1/4	- 3/8	-4.9
N	TEKTRONIX INC	29- 38	35 1/4	-2	-5.3
N	TELEX	2- 3	2 1/4	- 1/8	-5.2
O	WILTEK INC	1- 1	3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE OCT 19 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PROOS	6- 8	6 1/8	0	0.0
O	BALTIMORE BUS FORMS	1- 4	1 1/4	- 1/8	-9.0
A	BARRY WRIGHT	10- 14	12 1/4	- 1/4	-2.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17	- 1/2	-2.8
N	ENNIS BUS. FORMS	6- 7	5 7/8	0	0.0
C	GRAHAM MAGNETICS	11- 17	16 7/8	- 1/8	-0.7
O	GRAPHIC CONTROLS	13- 18	12 3/4	0	0.0
N	3M COMPANY	48- 56	48	-1 3/4	-3.5
O	MOORE CORP LTD	26- 37	25 5/8	- 1/4	-0.9
N	NASHUA CORP	16- 28	19	- 1/2	-2.5
C	STANDARD REGISTER	18- 25	20 1/2	- 1/4	-1.2
O	TAB PRODUCTS CO	10- 19	10	- 1/4	-2.4
N	UARCO	19- 22	18 1/2	0	0.0
A	WABASH MAGNETICS	10- 15	10 7/8	-1 3/8	-11.2
N	WALLACE BUS FORMS	17- 21	18 5/8	+ 3/8	+2.0

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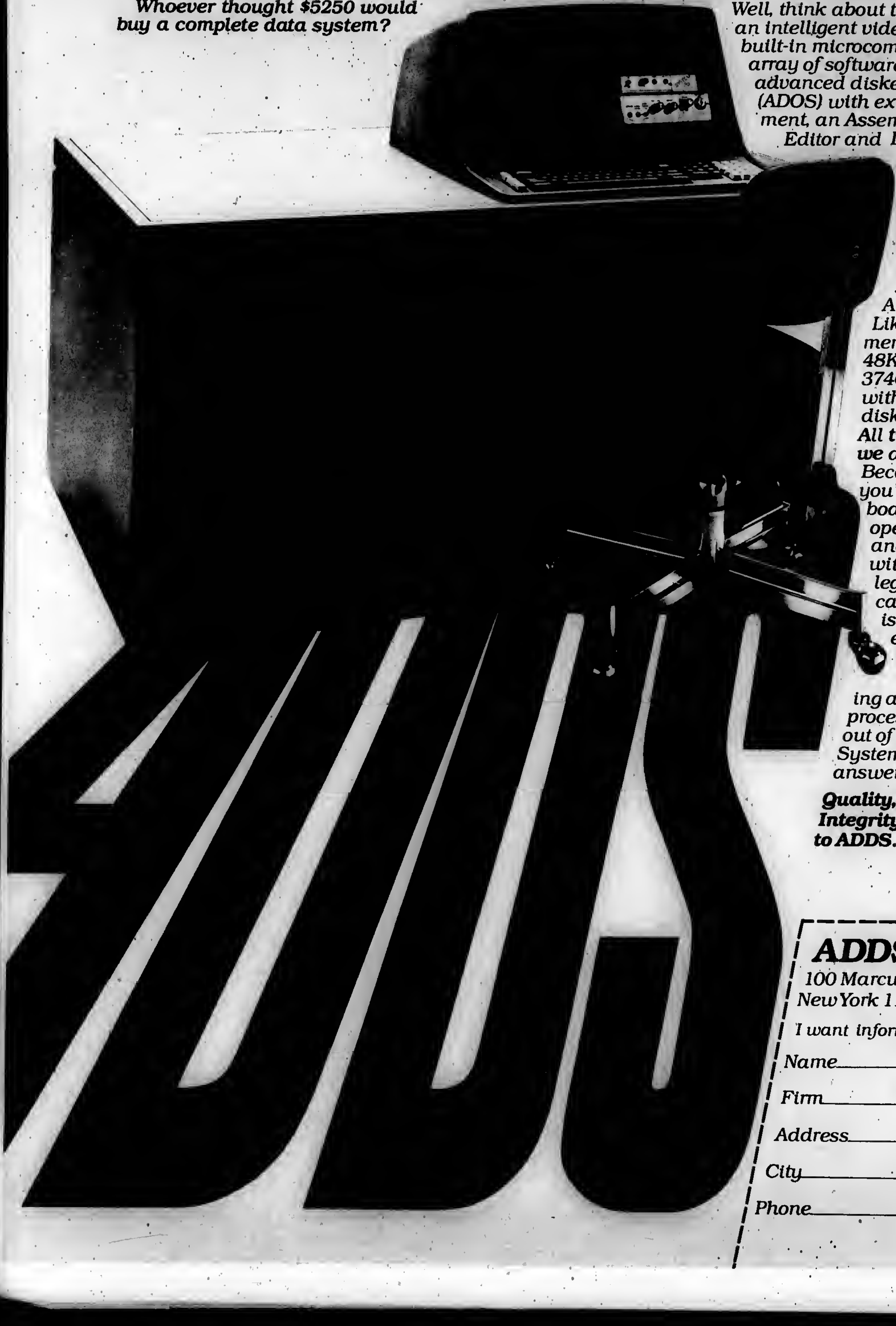

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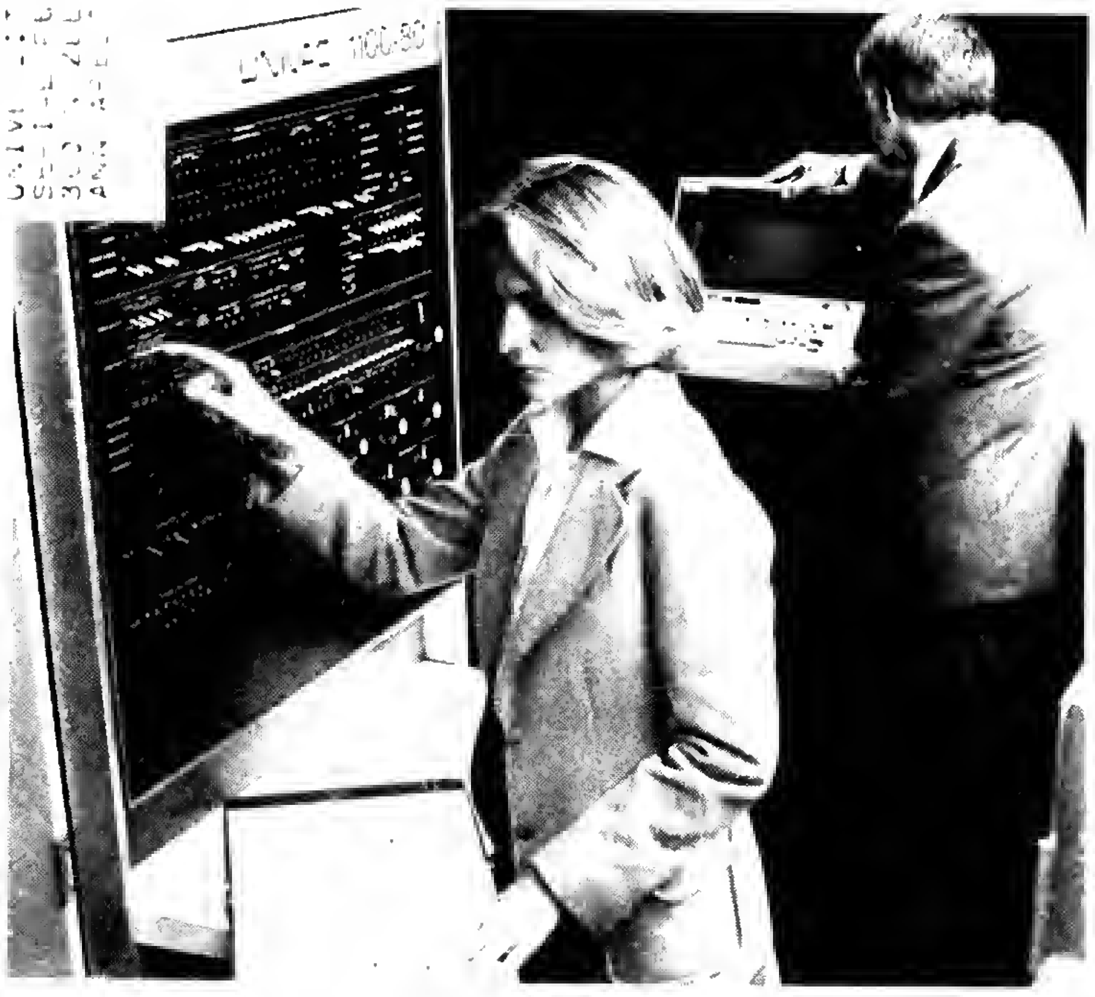


Univac introductions included entry-level 1100/80.

Five High-End Systems Swell Univac Offerings

By Don Leavitt
CW Staff

BLUE BELL, Pa. — The parade of new equipment grows longer. In the biggest announcement in its history, Univac last week introduced five systems at the high ends of its product lines.

Two of the systems are in the company's byte-oriented 90/80 "family" while the other three are extensions of the word-based 1100 series. All were described as alternatives to IBM's large 370s or the newer 30 series processors, as well as "natural growth paths" for installations already using Univac gear.

The 1M-byte 90/80-2 with a 130-nsec machine cycle time is said to generate "nearly 50% more central processor power" than the IBM 370/148 while being price-competitive with the IBM equipment.

The 90/80-3, starting at 1M byte of main memory and expandable in 1M-byte increments, has a machine cycle time of 98 nsec and also outperforms the 148, according to Univac. IBM users trying to match the power of the full-blown 4M-byte 90/80-3 would have to move to a 3031 processor, a spokesman claimed.

The 1100/80 extensions cover both ends of that part of the 1100 range. An entry-level 1100/80 system is said to offer users a better price/performance than the IBM 3031 while the three- and four processor systems — the 1100/83 and 1100/84 — "exceed the IBM 3032 and 3033 in performance," in Univac's view.

The "83" and "84" are the largest and most powerful systems currently offered by Univac, the spokesman noted. First deliveries of all models announced last week are scheduled during the second quarter of 1978, he added.

Easy Upgrading

Upgrading to those models should not be difficult for current Univac sites. The 90/80 extensions utilize the same VS/9 operating system as previous 90 series models, and the entire 1100 line runs under the 1100 operating system, so no conversion effort will be required, according to the spokesman.

In all cases, peripherals that can be used with existing models of either series of processors can also be used with the models just introduced, he said.

The latest 90/80 systems are made up of four major components — an in-

(Continued on Page 6)

Users Say Privacy Measures Make Good Business Sense

By Catherine Arnst
CW Staff

NEW YORK — Several users that have voluntarily set up their own fair information practices say protecting the privacy of personnel records "makes good business sense."

It makes good business sense because it improves employee relations, according to Donald Dewey, IBM program manager of personnel information.

Dewey, along with representatives from several other major companies that would be regulated if a privacy law for the private sector were passed, shared their experiences during a panel discussion held as part of a three-day briefing entitled "Privacy Regulation: Implications for the Business Community" conducted here recently by the American Management Associations.

Eliminating unnecessary data collection and restricting who sees sensitive employee information such as performance and medical records, for example, began at IBM in the mid-'60s, Dewey said.

IBM has almost 300,000 employees worldwide and 160,000 in the U.S. alone. In addition to the basic personnel data most employers keep, IBM has several appraisal programs which add to the immensity of its record-keeping system. All these records are completely open to the individual employee, Dewey said.

IBM must balance its requirements for data security with this open records policy. It attempts to separate personnel information from business data and also uses a "two-bucket theory" for collecting data, Dewey said.

One "bucket" of information is that data needed to make a decision on hir-

(Continued on Page 4)

Coverage of the privacy briefing continues on Pages 12-15.

Package Erases Portions of Disk

NASHUA, N.H. — A stand-alone software package that reportedly allows a user to selectively erase portions of data stored on disk has been introduced by Sanders Associates, Inc.

Called the Sanders Associates File Eliminator (Safe), the software runs on IBM 370 mainframes as well as on the newer 3031, 3032 and 3033 processors, according to a spokesman.

Safe operates independently of any mainframe operating system and executes in 256K of memory. The package can work with a variety of IBM disk systems including the 2314, 3330, 3340 and 3350 "or equivalent," Sanders said.

In addition to selectively eliminating data, the package can perform a total overwrite of disk data to eliminate proprietary information at the user's discretion. A triple overwrite of a 3330 double-density disk (808 cylinders) can be accomplished in an average

(Continued on Page 2)

DEC Unwraps 32-Bit Mini As PDP-11 Upgrade Option

By Jeffry Beeler
CW Staff

BOSTON — Users of Digital Equipment Corp. PDP-11s can how run programs as large as 32 million bytes without resorting to partitioning or memory overlaps. That word came from DEC here last week as the firm introduced its first 32-bit minicomputer, an upward extension of the PDP-11 line.

VAX-11/780 provides up to 4.3 billion bytes of virtual addressing space, holds a minimum of 128K bytes expandable to 2 million bytes and can perform in one instruction operations that would require multiple instructions with 16-bit machines, DEC spokesmen said.

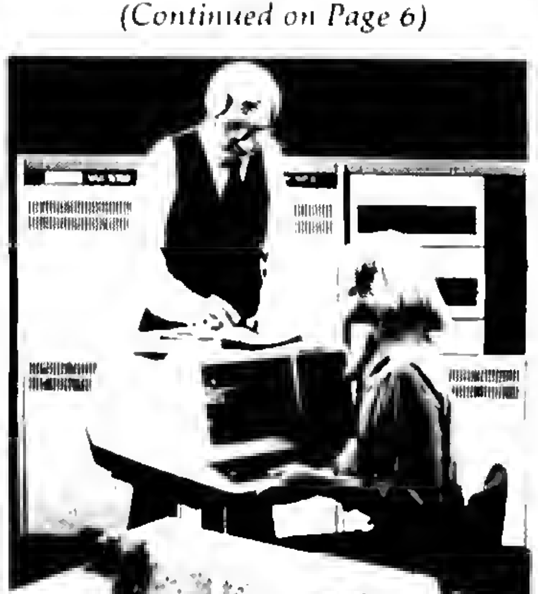
A Fortran DO loop, for example, requires only one instruction, and other functions have combined up to 15 operations in one instruction, the company added.

This increased operating speed suits the VAX-11/780 to time-critical scientific and industrial applications like aircraft simulation, power monitoring, process control and data acquisition, according to the firm.

DEC designed the 32-bit system to provide "a natural upward migration for PDP-11 users whose applications require additional address space and functionality," spokesmen said.

Compatible with all other members of the PDP-11 family, the minicomputer comes with an instruction set that uses microprogrammed logic and

(Continued on Page 6)



DEC VAX-11/780

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New IBM Examiner in the Works

By Catherine Arnst
CW Staff

NEW YORK — The government has asked that the person it recommended as an examiner in the U.S. vs. IBM antitrust trial be removed because "the public may perceive an appearance of conflict of interest."

The conflict of interest lies in the fact that the appointee is also working for Memorex Corp. as a paralegal in its antitrust suit against IBM [CW, Oct. 10].

The argument now revolves around who should replace him.

Herbert H. Isaacs, a director with Arthur Young & Co., was appointed by Judge David N. Edelstein at the request of the government to seach IBM files for statistical information on its installed systems [CW, Sept. 12]. The search was aimed at assuring the court that IBM had complied with Edelstein's orders for information.

Following Isaacs' appointment, IBM filed a writ of mandamus with the Second Circuit Court of Appeals asking that Isaacs be removed because of his Memorex connection.

At a conference Oct. 6 between attorneys for IBM and the government and Frank Scardilli, staff counsel for the Second Circuit, Scardilli advised the government that it should consider removing Isaacs because of the appearance of impropriety in the eyes of the public and the business community in particular.

Accountant or Lawyer?

Government attorneys apparently would be content with an accountant. In their motion, the Justice Department lawyers expressed the belief that "an accountant's professional experience in objectively evaluating machine-readable business record[s] would be useful in the absence of a technically expert lawyer."

IBM disagrees.

IBM attorneys see the issue of whether IBM has complied with "the spirit and intent" of court orders as a legal one. "We submit that neither an accountant, nor an engineer, nor any other nonlawyer can possibly approach the level of legal expertise and experience required to make that determination," an IBM memorandum said.

The defense also opposes the motion because it sees the government's action as an attempt "to retain absolute, unimpaired control over the list of examiner candidates submitted to the court for consideration." IBM wants a list submitted which is agreed upon by both parties, the firm's counsel indicated.

The government's motion said "IBM has made it clear that it opposes any examiner candidate [who is] not a lawyer, and neither party is likely to find a lawyer technically equipped to find information relevant to machine-readable data which is withheld by IBM. Plaintiff will explain IBM's position to prospective candidates."

IBM Offended

IBM took particular offense at the suggestion that the government would explain the firm's position. "We vigorously oppose [the government's] proposal unilaterally to explain IBM's position. Under no circumstances that I can imagine would such an ex parte communication by [the government] be justified or proper. Whatever [the government] thinks needs explaining, it is plainly not [the government's] function to do it," an affadavit by Thomas D. Barr, IBM lead counsel, said.

Most observers expect IBM to withdraw its writ of mandamus if and when an examiner acceptable to both parties is appointed in this case.

No Free Lunch

Someone is apparently using the *Computerworld* name in an unauthorized manner.

In the past week or so, CW has received calls from users who have been contacted by people identifying themselves as members of the "Computerworld Promotion Department — New Subscriptions" and offering "free" subscriptions in exchange for information on the people who work in the DP department.

Unfortunately, there's no free lunch and people who are making such offers are acting without CW's authorization and misrepresenting themselves if they say they work for us.

If you are contacted by such a person, please try to get his name and number and let us know.

'Safe' Erases Selected Data

(Continued from Page 1)

elapsed time of 18 minutes, the firm claimed.

The software can overwrite multiple disk packs "concurrently to the limit of available disk channels," the spokesman added.

To selectively erase a sensitive portion of data stored on a disk pack, the user cites the starting and ending address of the erase operation, he said. The package also serves as a diagnostic aid to certify disk packs and measure timing variations.

Safe is licensed at $1,750 for the first CPU, $1,200 for the second CPU and $900 for successive CPUs. It is available in 30 days from Sanders Associates, Daniel Webster Highway South, Nashua, N.H. 03061.

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Urges Halt on Implementation

Brooks Slams Proposed I/O Fips as Inadequate

By Molly Upton
CW Staff

WASHINGTON, D.C. — The revised proposed federal standard for channel-level I/O interfaces is "extremely inadequate" and its implementation should be suspended until it can be redrafted, Rep. Jack Brooks (D-Texas) recently told Commerce Secretary Juanita Kreps.

The chairman of the House Government Operations Committee joined a growing list of standards advocates who are dissatisfied with the "watered down" standard formulated by the National Bureau of Standards (NBS) for use by government agencies [CW, Sept. 12].

The revised proposed standard has elicited so many requests for an extension of the deadline for comments that NBS agreed to accept comments until Oct. 28, a spokesman said. The bureau will then prepare a "justification proposal" based on all comments and the economic impact of the standard which it will submit to Kreps for a decision, he explained.

Original Standard Draft

The original standard, based on the IBM channel interface, was drafted by the American National Standards Institute X3T9 committee and by the NBS as a Federal Information Processing Standard (Fips).

In analyzing the proposed Fips' weaknesses in an Oct. 14 letter to Kreps, Brooks said the apparent limitation of the maximum number of required interfaces to four may make the standard "worthless."

"Under this proposal, one channel of a system may meet the standard and another may not. Nonstandard equipment could be introduced to operate with standard types," he stated.

"Such a hodgepodge could degrade technical efficiency, reduce potential competition (current or subsequent), impact adversely on operational software and greatly increase cost," Brooks said in his letter.

Brooks also objected to the provision that agencies would be authorized to procure systems that do not comply with the standard. Cost evaluation of alternative equipment could be used by an agency to avoid acquiring equipment that meets the standard, he observed.

"Such a result would lead ultimately to increased operating costs, lack of competition, increased sole-source procurements and preclusion of subsequent governmentwide reutilization of equipment," he told Kreps.

Practical Effect

Because agency heads are given total responsibility for waiving the Fips, the practical effect would be that of "emasculating the standard," he added.

Brooks said the standard is "made inapplicable to the entire inventory" of federal DP hardware or to any future modifications of such equipment. "A large part of the current inventory of government systems," he said, "could be retrofitted to accommodate the I/O interface standard."

The standard's exemption of minicomputers, microcomputers and other small-scale systems, which now represent a majority of systems procurements, "could have serious unforeseen consequences," the congressman stated.

"Prior to issuance of the proposed standard, consideration should be given to determining the extent to which such categories of systems can be covered by the standard," he recommended.

IBM Not Guilty In Antitrust Part Of Forro Suit

SAN FRANCISCO — Judge Ray McNichols last week ruled in favor of IBM in the antitrust portion of the suit filed against it by Forro Precision, Inc.

The antitrust issues in the suit were left hanging when the six-person jury could not reach a decision on that aspect of the case, thus leaving unmarred IBM's record of never having antitrust charges decided by a jury [CW, Sept 26].

McNichols' decision granting an IBM motion overruled Forro's request for a new trial on antitrust charges.

Awards Appeal

But the judge let stand the awards assigned by the jury of $2.7 million to Forro for alleged interference with its prospective clients and of $260,777 to IBM for Forro's alleged misappropriation of IBM trade secrets.

IBM indicated it will appeal the $2.7 million award and Joseph M. Alioto, attorney for Forro, said he plans to appeal McNichols' decision on the antitrust charges.

Commenting on the decision, an IBM spokesman said, "We are of course pleased with the court's decision. It supports our strong belief that IBM in the conduct of its business has not violated the country's antitrust laws."

In January, another jury will hear more antitrust charges against IBM as the Memorex case goes to court.

ADR's ROSCOE Improves Productivity And Reduces Manual Tasks At Hibernia National Bank

ROSCOE Gave Our Programmers Their Own Computer "Our 30 programmers and analysts are very high priced people to be spending time keypunching and running around trying to find program decks. To cut that time and get out of the card business, we needed the ability to interact directly with our computer. The logical solution was ROSCOE," said Don Clark, DP Division Vice President. "Within a week after ROSCOE was installed we could see the change.

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Deregulation Better for Users, Bank Tells FCC

By Molly Upton
CW Staff

WASHINGTON, D.C. — The Seattle-First National Bank — a DP and data communications user — has advocated regulation of common carriers only in areas where a natural monopoly is clearly demonstrated to exist — as is the case with transmission facilities.

With this response to the Second Computer Inquiry, the bank aligned itself more closely with IBM than with AT&T.

The bank's comments were among 26 received by the FCC in connection with its inquiry, a study aimed at clarifying the boundary between data communications and data processing.

"There is a world of difference from the user's point of view in approaching a vendor where the service or equipment to be obtained is tariffed," the bank stated. "When dealing with an unregulated service, there is freedom of bargaining. The service or equipment can be tailored to the user's specific needs and special requirements can be met," the bank's filing continued. In addition, the user can contract for performance standards.

But with a regulated service subject to tariff, nothing can be varied by contract and the carrier's obligations and liability are often substantially limited, the bank indicated.

"The bank wants fewer tariffed teleprocessing services on the market, not more,' according to its filing.

Benefit to Vendors

Deregulation would benefit not only users but vendors, the bank believes, for then AT&T could respond more quickly to competition.

"AT&T and the other carriers should be taken out from under their blanket of regulation and allowed to compete to the maximum extent possible in the free market where there is freedom of action unencumbered by the restraints imposed by tariff regulation. They and their customers will be best served by such an occurence," the bank stated.

Seattle-First National Bank said it agrees with AT&T's initial filing that many users want package services rather than one piece of a network and that common carriers should be allowed to enter the teleprocessing services market.

But, contrary to AT&T's position, the bank sees no reason why a package service cannot be offered by unregulated entities.

AT&T's desire to broaden the definition of communications as used in the Communications Act of 1934 could potentially subject many TP services to regulation which are not now regulated, the bank observed.

Modified Consent Decree

The bank suggested a modification of the 1956 Consent Decree, which it said is warranted by the change in technology and the blurring of the line between DP and communications.

The 1956 Consent Decree restricts AT&T to offering only regulated communications services.

If the court that issued the decree does not wish to modify it," Congress could legislatively take action which would result in modification of the decree," the bank stated. Modification of the decree, which is meant to advance the public good, could serve to "protect the DP industry against unfair competition rather than all competition with AT&T in the teleprocessing market," the bank observed.

In the meantime, the bank suggested that the only tenable solution, which it does not advocate for the long-term, would be to allow carriers to offer a broad range of TP services on a regulated basis.

Any reform of the Communications Act should expressly give the FCC the discretion not to regulate when it determines such a position is in the public interest, the bank said.

But the bank took AT&T to task on its statement that teleprocessing services are best provided in a regulated framework or that teleprocessing is "socially too important to be entrusted to purely private decision making," as AT&T had stated in its first filing.

The bank feels the free marketplace "is generally a much better decision maker than governments" in ensuring that services are provided broadly and with socially desirable attributes.

Seattle-First said it recognizes that there will be some instances where some regulation of teleprocessing services is necessary to prevent abuses, but it added that often antitrust laws will be a sufficient deterrent.

"Where a need for limited regulation exists, Seattle-First National Bank would have no objections. However, the need for limited regulation does not justify all encompassing common carrier tariff regulation," the bank said.

Privacy Makes 'Good Business Sense'

(Continued from Page 1)

ing. The second "bucket" is that information gathered after an employee is hired, Dewey explained.

By analyzing the information requested in the two buckets, IBM was able to eliminate a lot of unnecessary data, he said. For example, it no longer requests a spouse's name because there is no need for this information.

There is also an attempt to keep data current, Dewey said. No grades from traning programs are kept and conviction records are destroyed after three years.

Employees may request their files at any time and are provided with a printout six feet long when they do, he said. With medical records, employees have full access to any records kept for government requirements or any voluntarily requested examinations.

However, doctors' notes are only reviewed with the employee by the doctor, Dewey said, noting this same procedure applies to a manager's personnel file.

As for releasing information to persons other than the employee himself, without prior consent, IBM will only verify employment. With the employee's written approval, the firm will release salary and performance information.

IBM makes an individual decision on each request for information from law enforcement agencies, Dewey said.

Medical Records

Medical records must be protected for much the same reasons Dewey gave for protecting other personnel records — it's good employee relations. Without the confidence of the patient, a doctor cannot get the cooperation needed to make a diagnosis, according to Dr. G.H. Collings Jr., general medical director for New York Telephone.

"The ethics of medical confidentiality has different meanings to different people," Collings said. In cases where the doctor is employed by the company, the doctor-patient relationship involves a third party and the patient can no longer be dealt with in complete secrecy.

However, the patient must feel secure that information won't go too far because the doctor needs the patient's cooperation to perform his job, Collings said.

"Employees universally respond favorably to medical records which guard information but judiciously release conclusions," he added. Conclusions, therefore, should not be kept confidential although neither should they be broadcast indiscriminately.

Low-Priority Item

The recommendations of Dewey and Collings exemplified some voluntary efforts businesses are making to meet the recommendations of the Privacy Protection Study Commission's report. It was to foster such voluntary compliance that the commission did not recommend immediate legislation, according to Jane Yurow, project manager for the commission.

The commission took a voluntary approach to compliance in the private sector "because a workable law was unfeasible at this time due to the complexity of recordkeeping," Yurow said.

Record control often tends to be a low-priority item, however. The prevalent attitude seems to be that "only troublemakers and cranks want to see their records," she said.

One weak spot in many corporations is in the area of insurance claim records which are often subjected to only minimal security measures, if at all, Yurow said. "Employees should not be required to have company insurance if there are no proper safeguards," she contended, suggesting that information of this type be "walled off" from other employee data.

Yurow also recommended that companies isolate mandatory medical records and pass out only the results and that any records concerning voluntary medical care be treated confidentially, as a private physician would.

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On DP, Communications Regulation

IBM, AT&T Responses Clash in FCC Inquiry II

By Molly Upton
CW Staff

WASHINGTON, D.C. — After a 90-day extension, IBM and AT&T, among others, filed reply comments that essentially echoed their original responses to the Second Computer Inquiry being conducted by the Federal Communications Commission (FCC) [CW, June 13].

IBM continues to maintain that the FCC should regulate at most those carrier services that perform a pure transmission function.

AT&T, on the other hand, reiterated its desire for a broad definition of communication, under which it sees itself operating in a regulated fashion.

The filings of IBM and AT&T were among 26 received by the FCC from various communications and services firms as well as industry groups. Although the Ad Hoc Telecommunications Users Committee, which filed on the first round last spring, made no reply, the user view was present in position papers from banks.

The Second Computer Inquiry, announced more than a year ago [CW, Aug. 9, 1976], seeks to clarify the boundary between data communications and data processing.

According to the FCC's proposal, data processing would be defined as "the use of a computer for the purpose of processing information wherein (a) the semantic content, or meaning, of input data is in any way transformed, or (b) where the output data constitutes a programmed response to input data."

Under the proposed changes, common carriers would be allowed to use DP for "network control and routing and I/O processing. They could offer "arithmetic processing, word processing or process control" only through separate subsidiaries.

Another part of the FCC proposal calls for the elimination of the hybrid services category, established by the First Computer Inquiry.

Under the hybrid services definition, services that are primarily communications-oriented but include incidental DP would be regulated and those services that are primarily DP-oriented but include incidental communications would be unregulated.

IBM Filing

The IBM filing indicated that carriers should be permitted to offer all services, except those that perform a pure transmission function, subject to certain safeguards to prevent commingling.

If necessary, the 1956 Consent Decree, which restricts AT&T to offering regulated communications services should be modified, IBM said.

The IBM document includes an appendix tracing the history of common carrier regulation on competitive activities. The appendix concluded that it would be a mistake to impose regulation on data processing and/or combined communications/DP services because of the higher cost, higher risk and decreased innovation that would likely result.

Regulation has a history of working when applied to "natural monopoly" industries, but of failing when applied to competitive industries, the IBM appendix said.

AT&T indicated that, when making jurisdictional determinations, the FCC must focus upon the service provided by the carrier and not upon the activity of the customer who is using the service.

IBM and others can interpret the commission's terms unrelated to definitions in the Communications Act to serve their own interests, AT&T said.

"We strongly urge the commission to reject suggestions to incorporate either examples of customer processing applications or detailed listings of functions in its final definition of what constitutes 'data processing' services," AT&T stated.

The AT&T reply brief reiterated the firm's position that the FCC's proposed rule be modifed to affirm that common carriers, "in providing communication services to meet increasingly varied and sophisticated user needs, may furnish data processing where it would enhance the service for the customer.

Assure Modern Technology

"Our recommendation would assure that modern processing technology is utilized in communication common carrier services and thus it is in the public interest," AT&T stated.

In addition, AT&T observed that its recommendation is "consistent with the Communications Act in that it recognizes the dynamic concept of 'communication' and the scope of the commission's regulatory jurisdiction embodied in that law and in judicial and administrative decisions."

AT&T's filing rebuts the stance of IBM, the Computer and Business Equipment Manufacturer's Association and others which advocate deregulation of all communication functions except "pure transmission."

Filings by unregulated vendors of data equipment and DP services have gone beyond the scope of Second Computer Inquiry and in some cases are not consonant with the Communications Act, AT&T observed.

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ABCs of ZBB

FAIRFIELD, N.J. — One-day seminars designed to provide attendees with a working knowledge of zero-base budgeting (ZBB) concepts and applications have been scheduled by Rapidata, Inc. in various cities during the next month and a half.

In Boston on Nov. 10, the seminar will feature an address by Peter Phyrr, who helped implement ZBB in Georgia when Jimmy Carter was governor of that state. Phyrr is generally considered the "father of ZBB," a Rapidata spokeswoman said.

In Chicago on Dec. 1 and in New York on Dec. 7, the featured speaker will be Logan Cheek, author of *Zero-Base Budgeting Comes of Age* and a member of the information sciences group at Xerox Corp.

The registration fee for each session is $175, Rapidata said from 20 New Dutch Lane, Fairfield, N.J. 07006.

High-End Systems Extend Univac Lines

(Continued from Page 1)

struction processor, a peripheral processor, a main storage unit and a system console. They are smaller than earlier systems in the line, partly because of the use of 16K semiconductor chips and partly because the instruction processor and peripheral processor have been consolidated in a single cabinet, he said.

Minimum configuration consists of five I/O channels, including one byte multiplexer and four block multiplexers. This is expandable to a maximum of eight channels, including either six or seven block multiplexers and two or one byte multiplexers.

Conversion from a 90/80-2 to a 90/80-3 can be handled through a field engineering change requiring only a few hours, the spokesman added.

Purchase price for the 90/80-2 central processor complex will range from approximately $720,000 to $878,000; five-year gross lease rates will range from $17,600 to $21,600 monthly.

For the 90/80-3 central processor complex, the cost will range from about $900,000 to $1.2 million with five-year lease rates from $22,500 to $29,500 monthly.

Multiprocessor Power

While the entry-level 1100/80 has less power — and a lower price tag — than the 1100/81 introduced last November, the "high-performance" 1100/83 is said to have almost three times the power and the 1100/84 four times the power of the earlier system.

The range of performance includes a two times price/performance advantage of the year-old, single-processor 1100/81 over the IBM 3031, Univac claimed.

The 1100/80 architecture includes both central processing units and I/O units. The basic configuration includes one of each while the maximum configuration has four of each type of unit.

All the systems in this line have a cache or buffer memory as well as a main or backing storage. The single-processor systems have buffers of 4K words expandable to 16K words, while the multiprocessors start at 8K and go up to 32K words.

The main memory of the 1100/80 systems starts at 524,000 words and can be increased in 524,000 or 1M-word increments to a maximum of just over four million words. This part of the hierarchical memory systems uses a 16K semiconductor storage element.

Average buffer access time to the central processor is 100 nsec, the spokesman noted, adding the central processor has a cycle time of 50 nsec.

Basic Configuration

The basic I/O configuration includes six channels (one byte multiplexer, one block multiplexer and four word channels). The full complement includes eight channel modules per I/O processor or 32 channels selected from all the types available.

The entry-level 1100/80 central processor complex will cost approximately $1.23 million and the five-year lease rate will be about $28,000 monthly, according to Univac.

Purchase prices of typical 1100/83 and 1100/84 central processor configurations will vary from $3.7 million to $4.7 million. Five-year lease rates will range from $84,000 to $105,000 each month, the spokesman estimated.

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DATA PROCESSING SECURITY, INC.

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DEC Offers 32-Bit Mini

(Continued from Page 1)

consists of 243 instructions, nine addressing modes and five data types, DEC officials explained. The instruction set also uses the same mnemonics as other PDP-11s and includes integral floating point, packed-decimal arithmetic, character string manipulation and context switching instructions, the officials added.

System Compatibility Increased

To further increase the system's compatibility with other PDP-11s DEC designed the VAX-11/780 to accommodate both DCL and MCR command languages and to implement Fortran-IV-Plus, Basic-Plus-2 and Cobol, the firm said.

The system also uses a Unibus for connecting to small disks, CRT terminals and printers as well as integrated Massbus adapters for interfacing high-speed peripherals like DEC's RP06 disk units and TE16 magnetic tape units, the company continued.

Users can connect one Unibus adapter and up to four Massbus adapters to the system's backplane, spokesmen explained.

Backplane Interconnect

VAX-11/780's Synchronous Backplane Interconnect (SBI) serves as the system's main control and data-transfer path and permits an aggregate throughput of 13.3 million byte/sec with a 1.5 million byte/sec throughput for the adapter pathway between the Unibus and SBI, according to DEC.

Among its other hardware features, the system provides an 8K-byte write-through memory that permits memory accessing in 290 nsec and an optional floating-point accelerator that performs double-precision, floating-point 64-bit addition in 1.4 microsec, the firm said.

The system also provides 16 32-bit general registers and 32 interrupt priority levels, 16 each for hardware and software, the spokesmen explained. Four hierarchical protection modes, each with read-write access control, support the system's paging memory management, they added.

Supported by DEC's VAX/VMS operating system, the minicomputer serves up to 64 interactive users simultaneously and provides batch capabilities that include job control, spooled input and output, operator control and conditional command branching and accounting, DEC said.

Management Facilities

Record and file management facilities include sequential and relative file organization plus sequential and random access. Program development features include two editors, language processors, a symbolic debugger, librarian and utilities, the firm explained.

A minimum VAX-11/780 configuration consisting of the CPU, 128K bytes of ECC MOS memory, an LA36 Decwriter II console, two RK06 14M-byte disk drives, a VAX/VMS operating system and a multiplexer with eight EIA connections costs $128,000, the company said.

With 256K bytes of memory, one RM03 67M-byte disk unit, a TE16 magnetic tape drive and an eight-line multiplexer, the system costs $153,000, while a configuration incorporating an RP06 176M-byte disk drive unit and a TE15 800/1,600 bit/-in. magnetic tape unit costs $185,000, DEC added.

Deliveries of the VAX-11/780 system will begin early next year, the company said from Maynard, Mass. 01754.

Correction

A recent story indicated that Wang's Manufacturing Management System (MMS) is available for the recently introduced Wang 2200VS processor [CW, Oct. 24]. This is not the case, according to a Wang spokesman.

In Accepting DPMA Award

Couger Credits Schools for DP-Wise Managers

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. – Dramatic improvements in undergraduate computer science instruction could someday make computer-shy business managers as much of a rarity as the buggy whip or the windmill.

Each year, the nation's colleges and universities graduate more than 100,000 business administration majors with strong computer science backgrounds. As these computer-literate graduates enter the job market, they take over management positions formerly held by their less technically qualified counterparts.

If this trend continues – and every indication suggests it will – executives who have little or no computer science grounding could find themselves with nothing left to do but "bask in the breeze at their retirement homes," Dr. J. Daniel Couger, professor of computer and management science at the University of Colorado and a *Computerworld* columnist, remarked during a post-luncheon address that marked the final day of Info/Expo '77 here recently.

The luncheon was held to honor Couger's selection as the Data Processing Management Association's (DPMA) Computer Science Man-of-the-Year.

During his address, Couger attributed the recent proliferation of computer-trained executives to a coordinated effort to strengthen computer science instruction at the university level.

This effort is creating a generation of managers for whom computers are a natural part of education and business administration, he said.

On-Line Opposition

Elsewhere in the management world, however, opposition to on-line systems remains as strong as ever, Couger pointed out. He blamed this reluctance to use computers on four factors:

- The widespread belief that use of on-line terminals is somehow beneath the dignity of those in top management.
- A tendency to think the information needs of top executives are less dynamic than those of first-line supervisors.
- Wariness caused by unpleasant experiences with batch systems.
- Skepticism that computers are really necessary for success as an executive.

Couger finds the first argument difficult to accept, he said. By streamlining many time-consuming administrative tasks, computers free managers to spend more of their time on important functions like planning, controlling, organizing and coordinating.

Poor Understanding

The second reason that managers often give for not using computers betrays a poor understanding of the main value of computers, Couger continued. Contrary to what most people think, the primary function of computers is not to speed data processing, but to perform tasks that humans find difficult, he noted.

This capacity for doing tough jobs is perfectly consistent with the needs of top managers, whose analytical powers are tested more and more as they advance up the corporate ladder, Couger explained.

The third obstacle to management acceptance of computers is somewhat easier to understand, he admitted – why should a user who has experienced trouble with batch-oriented applications believe that on-line systems will be any different?

The fourth reason for executive resistance to on-line systems is perhaps the most understandable of all, Couger said. Managers who have advanced to the top of the corporate ranks without the help of a computer frequently ask why they should learn to use a computer now.

CW Photo by J. Beeler

J. Daniel Couger

Guide to Top DPers Updated, Published

PHOENIX – Applied Computer Research has published the latest semiannual issue of the "Directory of Top Computer Executives."

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Small Machines, Big Places — Part 1

Large Users Tending to Centralize Mini Policy

By Esther Surden
CW Staff

WALTHAM, Mass. — Very large companies are feeling the impact of minicomputers and are reacting with policy decisions concerning their selection, purchase, implementation and use, according to a report issued by International Data Corp. (IDC).

"Minicomputers: The Impact on Large Organizations" was based on personal interviews with 24 management information systems (MIS) directors of Fortune 1,000 firms, interviews on distributed DP with 30 MIS directors and other supplemental information compiled by the market research firm here.

A definition of "minicomputer" emerged from these interviews: "For the majority of decision makers, a mini is something that can perform in a fashion comparable to a Digital Equipment Corp. PDP-8 or PDP-11," IDC found.

Large organizations are centralizing their control over minicomputer purchase decision, the report indicated.

For 21 of the 24 organizations interviewed, "the central group has veto power over the acquisition and use of minicomputers throughout the organization."

For four of the 21, this veto power extends to business applications and not minis in the manufacturing/industrial environment, although the MIS department works closely with the industrial group in that decision.

More than $1 billion in minicomputer equipment was shipped to U.S. users in 1976, bringing major changes in the way these installations — now numbering about 175,000 — manage the economic and organizational aspects of their information processing.

This two-part series looks at the impact of minis on the larger companies that have installed them.

The MIS directors justified their centralization of control in several ways. Purchases of minicomputers should be coordinated with the long-term DP goals of the company and the MIS department is the most likely department to provide the overall view, several firms reasoned. Many of the surveyed organizations noted that enough minis will be purchased over the next few years to provide economies of scale in software development areas. In addition, the MIS department could aid future users by passing on the knowledge gained as a benefit of experience, they said.

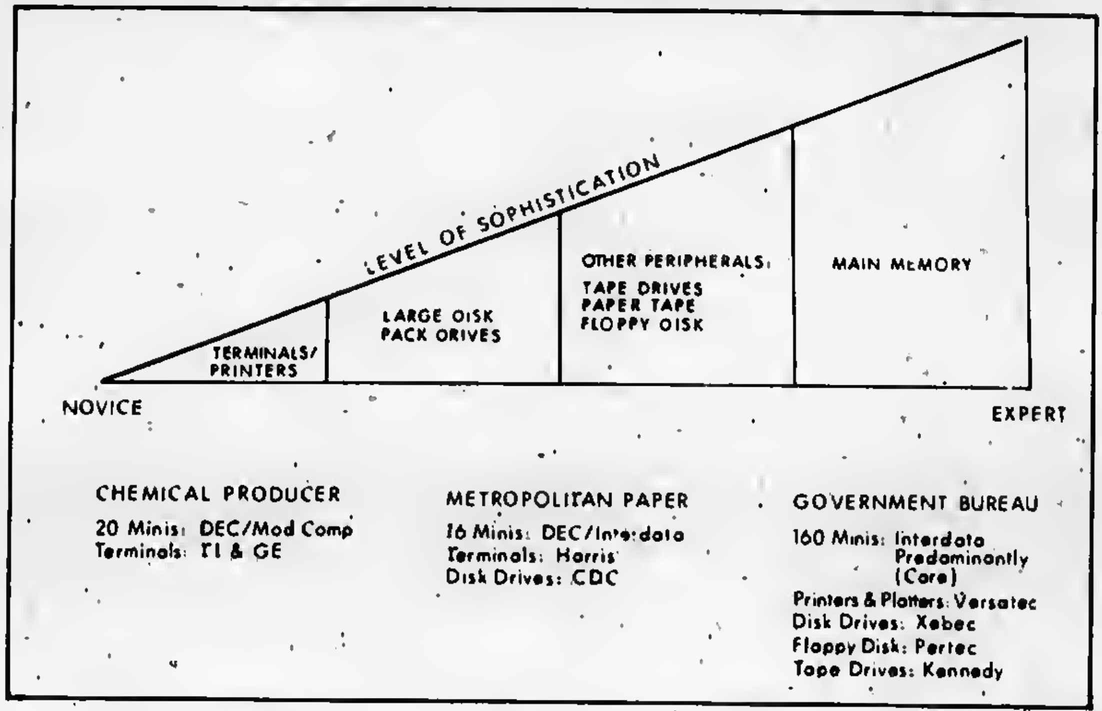

Chart Courtesy of IDC

User Sophistication and Tendency to Buy Independent Peripherals

Other firms rationalized that "quite often, even in the initial use of a minicomputer, some information that would be collected . . . will be useful to the central MIS group, and the only way to determine if that would be the case would be to have the MIS group involved in the selection, specification, application development and installation" of the mini, the report stated.

Also, the companies hoped to prevent history from repeating itself — from adding application after application to the mini while making a corresponding increase in staff to the point that new jobs would be incrementally less efficient.

The companies also thought that having the central group involved would shorten the time needed to acquire and install a mini because the central group would have already reviewed all offerings from various vendors.

Also, the firms said a central group could cut the time needed to develop the software on new minicomputers since it "would already have expertise along the lines of implementing minicomputers . . . This assumes that the central group is responsible to the needs of the organization" and does not put the request in a long waiting queue, the report noted.

The final reason given was that the end-user department was not in the position to evaluate other, non-minicomputer DP solutions to their problems.

Distributed data processing, regardless of the definition used, serves as a focal point around which users can bring the latest technology into the organization and so is an impetus for centralized control, IDC said.

The acquisitions "are under central control, so that potentially all the pieces can function as a network when the time is right," the research organization added.

While the decision-making process was generally controlled by a central department, this did not mean the surveyed companies standardized on particular minis or even on the peripherals

(Continued on Page 10)

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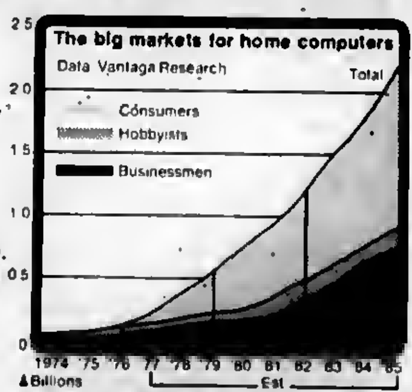

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Programmer Productivity Lagging, Report Says

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Programmers productivity, rather than equipment performance and costs will be the industry's chief problem over the next decade, participants in an American Federation of Information Processing Societies (Afips) report concluded here last week.

The cost/performance ratio of DP hardware has improved by a factor of 100 each decade since 1955, according to T.B. Steel Jr., a member of Share, Inc.'s IBM Liaison Team (Silt) committee, writing in the Afips study, entitled "Information Processing in the United States: A Quantitative Study." He added that all indications and available data suggest that this trend will continue for at least the next 10 years.

At the same time, however, programmer productivity — "A primary factor in the cost/performance ratio for computer software" — appears to be improving at a rate of not much over 3% per year, Steel said.

See related story on Page 51.

Unless new software technology, such as programming languages, structural programming and top-down design, can turn the need from programmer training to training users at intelligent terminals or minicomputers, data processing will become the nation's most labor-intensive industry, with the possible exception of agriculture.

In an afterword to the Afips study, Steel, a consultant, called the predictions made by the Afips report "at best conservative."

Steel based his remarks on a 1976 study he did with T.A. Dolotta and several others, entitled "Data Processing in 1980-85: A Study of Potential Limitations To Progress," which was published by Silt.

13% of GNP

The Silt report, as that study has come to be known, suggested that the DP industry, including every factor from supplier activity to user costs, will account for 13% of the nation's gross national product (GNP) by 1990.

Further, between 15% and 20% of the total U.S. labor force will be required to have some knowledge of data processing and about 65% of that labor force will be dependent in some measure on the use of data processing.

Further data from the Silt report suggests that by 1990 there will be approximately 175,000 large-scale general-purpose computer systems installed at various sites in the U.S. and close to one million dedicated systems for such application areas as process control, inventory management and data entry.

Meanwhile, the computer programmer population will grow to approximately one-third of a million by 1985, Steel said. Despite the lack of consistent occupation definitions which makes forecasting for this profession difficult, almost every study suggests that the maximum number of programmers industry can recruit, train and absorb increases by a factor of three every five years.

Programmer training and productivity becomes "the critical path in dealing with data processing in the next decade," Steel concluded. "We can almost forget the hardware situation. It will take care of itself."

Software production is already a major national industry and yet no measures exist for evaluating the product, the manufacturers and the programmers, Frederic G. Withington, senior staff member of Arthur D. Little, Inc., said, echoing Steel's comments.

Asked by Afips to comment on the implications of its report to the federal government, Withington expressed his hope that government will take an active role in fostering the desirable growth of measures for software. He looks specifically for standards, particularly on documentation, and constraints on the ownership and movement of data — in and out of government.

Communications were not a subject of the Afips report but should have been, the Arthur D. Little staff member said.

The report was edited by Philip S. Nyborg, Pender M. McCarter, and William Erickson.

Shown above, left to right, are Philip S. Nyborg, Pender M. McCarler and T.B. Steel Jr.

COBOL programmers . . .
Teach yourself structured programming

Everyone talks about structured programming, but nobody seems to do anything about it. From a programmer's point of view, I think that's a big mistake.

In my opinion, an outstanding programmer today must be able to design, document, code, and test programs using structured programming techniques. Although there is still debate about what the best techniques are, there is no doubt that effective use of structured programming can have a major effect on productivity.

With this in mind, I'm happy to announce an important book on structured programming. It is called *Structured Programming for the COBOL Programmer* As I see it, it is the first book or course that presents a method for implementing structured programming that is complete, logical, and practical.

This book is so effective that we sell it with an ironclad guarantee. If you can't learn how to design, document, code, and test structured programs from it, you can return it for a full refund ... no matter how long you've had it.

Once you complete this book, I think you'll enjoy programming more than you ever did before. Because Paul's method is so logical and orderly, you will be more confident and efficient than you were before. And many studies have linked morale with productivity.

What this Book Does

Like other books on structured programming, this book presents the theory behind the structured programming movement. Unlike other books, however, *Structured Programming for the COBOL Programmer* presents a complete system for applying the theory. In just six chapters, you will learn how to design, document, code, and test structured programs in COBOL.

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In chapter 3, you'll learn how to document the modules using HIPO documentation. You'll learn the six steps for creating HIPO diagrams ... what language to use in the process box ... when and how to use extended descriptions ... how to keep the modules independent ... and so on.

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3. This book presents structured programming in the context of COBOL. As a result, you will see all of the structured coding techniques in COBOL (and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book; you'll see structured COBOL program stubs, test plans, and much more. In my experience, these illustrations, more than any other factor, determine whether an EDP course is effective .. and they are the missing ingredient in other structured programming books.

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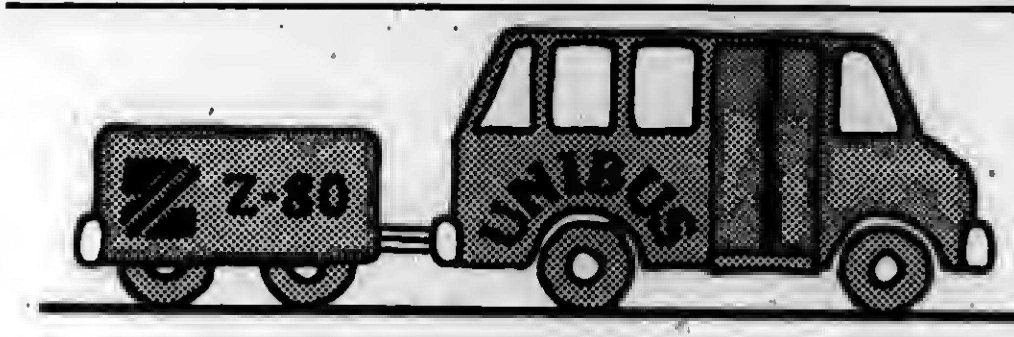

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Canadians Pass Law Protecting Data Banks

By Nancy French
CW Staff

OTTAWA — The Canadian government has passed a law to protect person..l information in federal data banks. — both manual and computerized — from abuse or misuse.

The data protection law is a small part of a general law that extends Canadian human rights and proscribes discrimination on the basis of race, national or ethnic origin, color, religion, age, sex, marital status or previous conviction for which a pardon has been granted.

Although it does not apply to records in the private sector, the act calls for a privacy commissioner whose duties include studying the advisability of applying the provisions of the law to nongovernment data banks.

The law exempts files from the reporting requirement if their publication might endanger international relations, national security and federal-provincial relations.

It also exempts agencies' personal records from access by individuals if those records would be likely to disclose information obtained or prepared by an agency in relation to national security, or in the course of investigations pertaining to the detection or suppression of crime generally or to a particular offense. In addition, the law exempts files whose publication might lead to harm to an individual about whom they have been compiled, reveal personal information , concerning another individual, impede the functioning of a court or law established under the Inquiries Act, or disclose, legal advice or other privileged communication between lawyer and client in a matter of public business.

Right to Consultation

The law gives each individual the right to be consulted before personal information given to the government for one purpose is used for any "non derivative" purpose unless that use is also authorized by law.

If agencies wish to use personal information for purposes other than those for which it was gathered, they must inform the individual in writing. If he does not respond in writing to the contrary within a prescribed time period, he will be "deemed to have been consulted and to have consented" to that use, the act says.

The law also requires that a designated minister in each department assure that his information banks are maintained in compliance with the law and that he prepare and distribute guidelines concerning that operation to various government institutions.

It also requires the minister to coordinate the collection, retention, use and storage of information in a manner that avoids unnecessary collection of information. He is charged with reviewing use and modification of existing information banks as well as proposals for new ones with an eye toward recommending termination of files that are underutilized or improper.

In addition to studying possible nongovernment applications of the law, the privacy commissioner will be responsible for receiving, investigating and reporting on complaints from individuals whose rights are denied under the law.

If the commissioner finds that an individual's rights have been abridged, he must give the appropriate minister a finding of the investigation with his recommendations, and where appropriate, a specified time period in which to implement his recommendation or to say why no action will be taken.

The commissioner is also charged with communicating his finding to the complainant or to his representative.

The commissioner will also file an annual report to Parliament on his activities.

The law becomes effective on a day to be "fixed by proclamation."

Users Centralizing Policy

(Continued from Page 8)

supplied by their vendors.

The manufacturing sector exhibited less of a commitment to a single vendor than did the commercial environment, because manufacturing's needs called for more single stand-alone processors "whereas the commerical environment often required equipment to be compatible with networks in place or soon to be implemented."

The users surveyed had systems covering the gamut of minicomputers and small business systems. Some of the vendors represented were . Digital Equipment Corp, Data General Corp., Texas Instruments, Inc., Hewlett-Packard Co., Systems Engineering Laboratories, Modular Computer Systems Inc., IBM, Interdata, Varian Data Machines (but not Univac,) Honeywell Information Systems, Inc.; Wang Laboratories, Inc., Singer and Datapoint Corp.

Large organizations made up of sophisticated users generally use independent peripherals more often than smaller firms, the report noted.

"As users become increasingly sophisticated in their use of minicomputers they depend less on the minicomputer vendors as their source of peripheral equipment," IDC reported.

The companies were most willing to buy independent terminals and printers. Disk pack drives, other peripherals and main memory were the next most likely purchases.

However, one large organization told IDC it used independent peripherals only when they were less expensive than what the vendors offered or when the required equipment couldn't be obtained from the vendor.

A majority of commercial users have made enhancements and adjustments to their installed systems over the last two years, the study showed. System and processor upgrades, increases in main memory, disk storage expansion, changes in storage media, changes in tape drives and the addition of terminals were common among the users.

Next week, one of the best-kept secrets in the computer industry will be revealed on these pages.

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Voluntary Data Protection Not Enough: ACLU

By Ann Dooley
CW Staff

NEW YORK — Information collected about an individual becomes a larger reality than the person himself, according to Aryeh Neier, executive director of the American Civil Liberties Union (ACLU).

Speaking at a panel discussion on personal records and their impact on employment, Neier said that although many companies favor self-regulation rather than privacy laws, individual privacy cannot be guaranteed without new laws.

Collecting information about people is a common practice and so, too, is judging people on the basis of that information, he told attendees at a three-day briefing entitled "Privacy Regulation: Implications for the Business Community," conducted here recently by the American Management Associations.

Neier

CW Photos by A. Dooley

Farr

Employers screen out people by looking at their records before even seeing the individual, Neier said. This kind of procedure is necessary because it saves time for the person in charge.

"You people here have achieved a certain amount of success, there either is no damaging information about you or you have been able to conceal that information. But some people can't," Neier told the audience.

For example, although all arrest records become part of an individual's history, an arrest is not the same as a conviction and doesn't prove anything, he pointed out.

The federal government has estimated that 50% of all males have arrest records, he added. The statistics also indicate that 60% of all nonurban males and 90% of all urban males will have arrest records in their lifetimes.

Many of these people will manage to live as ordinary citizens, but some won't be able to escape the information recorded about them, Neier said.

This pariah population can't get useful employment and so becomes a danger to others by preying on them to survive. Neier said, adding that this population seems to be growing.

The FBI circulates 29,000 arrest records daily to government agencies, private investigative agencies and local law enforcement agencies, he said.

If privacy legislation were passed to restrict data collection, the risk for society would decrease even though individual places of employment may run a greater risk of theft or other type of crime, according to Neier. There would be less mugging on the streets, but perhaps more dollars lost by the company, he said.

Relevance is the issue, according to Neier.

As for medical records, the only information an employer should know about an employee's medical history is whether that individual is physically unable to do a particular job, according to Neier.

The Privacy Protection Study Commission should have leaned further toward legislation, Neier said. The commission said businesses haven't had a chance to see if self-regulation will work, but in fact they have had their chance, he added.

Penney's Files Open

Arguing for self-regulation, Charles Farr, personnel manager for J.C. Penney Co., said Penney's has already implemented many of the privacy commission's recommendations in the area of employment.

The company continually reviews its policies to make sure they meet the current legal standards in employment, he said. The company also polled its employees to see what they thought was important on an application form.

In response to their opinions, Penney's eliminated much of the requested health data, he said. Now the application only seeks to find out if there is any physical disability that would impair job performance.

Criminal conviction information is only requested if the job being applied for involves a position of trust.

Penney's also has a policy of personal access to personnel records, he said, explaining it is important for an individual to know where he stands with the company so he can change his behavior if need be.

It also gives him the chance to pick out any errors or make changes in the file, he added.

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If Businesses Comply Voluntarily

Private-Sector Privacy Act Avoidable: Westin

By Catherine Arnst
CW Staff

NEW YORK — If businesses reexamine their personal recordkeeping practices and correct abuses voluntarily, the call for legislation at both the state and federal level will fade, Dr. Alan Westin, Columbia University professor of public law and government, told attendees at an American Management Associations briefing on privacy regulations and their implications for the business community.

"I'm not sure that legislation is inevitable ... it's not a prime issue at the national congressional level," Westin said. However, companies that voluntarily respond to privacy concerns will benefit in the long run because they will not have to change their systems later if legislation is passed, he added.

Privacy in this country has gone through three phases so far, he said. The years from 1964 to 1969 marked the "period of early alarms," which was "symbolically kicked off" by two books on information abuses — *"The Privacy Invaders"* and *"The Naked Society."*

Although early alarms weren't always focused on recordkeeping, the emphasis shifted to this area with the proliferation and visibility of computers, Westin said. Three assumptions became widespread and generally accepted:

- When an organization got a computer, it automatically started collecting more information.
- As more companies got computers, they would exchange information.
- More secret records would be kept.

Many feared the computer age had its own momentum — the machine was out of control and the capacity to stop it was lost, according to Westin.

Second Phase

The second phase, from 1969 to 1973, was dedicated to empirical research and was "all investigation with no action," Westin said. At that point one of the things learned from these investigations concerned the state of the DP art itself.

Automation was such an expensive process that it created its own safeguards; companies were reluctant to automate any but the most frequently used or critical data.

It was also learned that information tends to be a resource, and the computer only allowed companies to perform the same kind of information exchanges performed before, but more rapidly and efficiently, he said.

As for more secretive recordkeeping, the rules a company followed before it acquired a computer tended to be the same ones it followed afterward, he added.

Nixon: Patron Saint

Richard Nixon then became the "patron saint of privacy legislation" because Watergate caught the attention of the nation and highlighted the potential for information misuse, he said. After Watergate, no one had trouble justifying privacy legislation, he added.

Thus, starting in 1974, the third phase began — the phase of "initial regulation," as Westin called it. The first federal Privacy Act was passed in that year, but this law had been preceded in 1970 by the Fair Credit Reporting Act, which provided a tool for measuring procedural effectiveness and paved the way for the Privacy Act.

The 1974 act was also helped by political considerations — Congress owed retiring Sen. Sam Ervin a large debt for chairing the Watergate hearings and it also knew something relating to privacy protection had to come out of the 1974 elections, but it didn't know how far to go, Westin said.

Most legislative action was deferred until the Privacy Protection Study Commission published its report, he said. That report, issued last summer, did not recommend immediate legislation, but instead advocated that the private sector be given a chance to voluntarily comply with its recommendations.

There are now three positions that can be taken in regard to "what's next," Westin said. "We can stay with the status quo" and not pass any major legislation; "We can have rifle-shot legislation" aimed at specific critical areas; or omnibus legislation can be enacted with a complete code as a model for either the state or federal level.

Westin favors a federal omnibus law, but not until "as much good practice as can be counted on has taken place voluntarily in the private sectors."

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Credit Reporter Warns Against Privacy Laws

By Ann Dooley
CW Staff

NEW YORK — "If it ain't broke, don't fix it" is Jeff White's advice concerning privacy legislation.

Speaking at a recent American Management Associations briefing here on "Privacy Regulation: Implications for the Business Community," the group vice-president of Equifax, Inc, said consumer credit is responsible for the present U.S. standard of living and information is needed to assist in the decision-making process of granting credit.

Credit agencies must coexist with a government which is increasingly involving itself in business, White noted, adding credit companies must also coexist with the trends of inflation and consumerism.

The cry for government intervention to protect privacy is becoming more widespread; while the public guards its privacy, however, it also doesn't want to give up the benefits of living on credit, White said.

But, some privacy must be relinquished in order for the businessman to make intelligent decisions, he pointed out. What must be found is a balance between the businessman's right to know and the individual's right to privacy, he said.

An individual can't have it both ways — complete privacy and easy credit — so fair information-gathering procedures must be established, he stated.

Congratulating the Privacy Protection Study Commission on its recent study, White said he agreed with almost everything in the report.

He did, however, object to the recommendation that "government mechanisms" be established to determine what data can be gathered. White warned the credit industry to be cautious before giving up to a government body a right so necessary to its work.

"If you can't see the end result, don't build it," he added.

The privacy commission also recommended that credit grantors utilize only those investigative credit agencies which comply with the commission's recommendations, White said. That seems to indicate the commission expects all its recommendations to become law and that each of its recommendations will be regarded as beneficial by the majority of people, he noted.

The commission made recommendations so an individual could decide logically about the use of his credit files, but failed to consider the dollar cost for the credit companies, he added.

Commission's Job

Since the Fair Credit Reporting Act was implemented, the credit industry has changed. Large companies like Equifax have become a dominant part of the market, and the commission decided to determine whether existing laws were adequate, according to Chris Heller, former privacy commission member.

To begin with, the commission reviewed existing laws to see if they were adequate or if new ones were needed to patch up the problem areas, he said.

The commission found the issues hadn't really been addressed the first time around, when they should have been, Heller said. It discovered consumers were interested in why they were denied credit, but it was difficult for them to find out the reason.

It's a "Catch-22" where an individual is shuffled between credit companies and investigative credit bureaus. Each tells him a little bit, but not what it means when it's all put together, Heller said.

Commercial credit "wasn't a tidy thing for the privacy commission to grapple with because it's a dynamic, changing industry," he said. But even though the issues were difficult to handle, they are fundamental, he added.

DP Curricula Slated As Workshop Subject

ORLANDO, Fla. — The IEEE Computer Society and the Association for Educational Data Systems will hold a workshop on new two- and four-year computer science and engineering curricula at the Sheraton Jetport Inn here. Slated for next February 2-3, the workshop will also deal with business data processing curricula.

Participants will be able to present short papers on topics like information science programs, analysis of curricula material and appraisals of data processing programs at junior and community colleges. Send three copies of contributed papers (double-spaced, two to 15 pages long) by Nov. 15 to Prof. David Rine, Information Science, Illinois University, Macomb, Ill. 61455.

Deadline for preregistration is Jan. 27. For more information, contact Harry Hayman, Executive Secretary, IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

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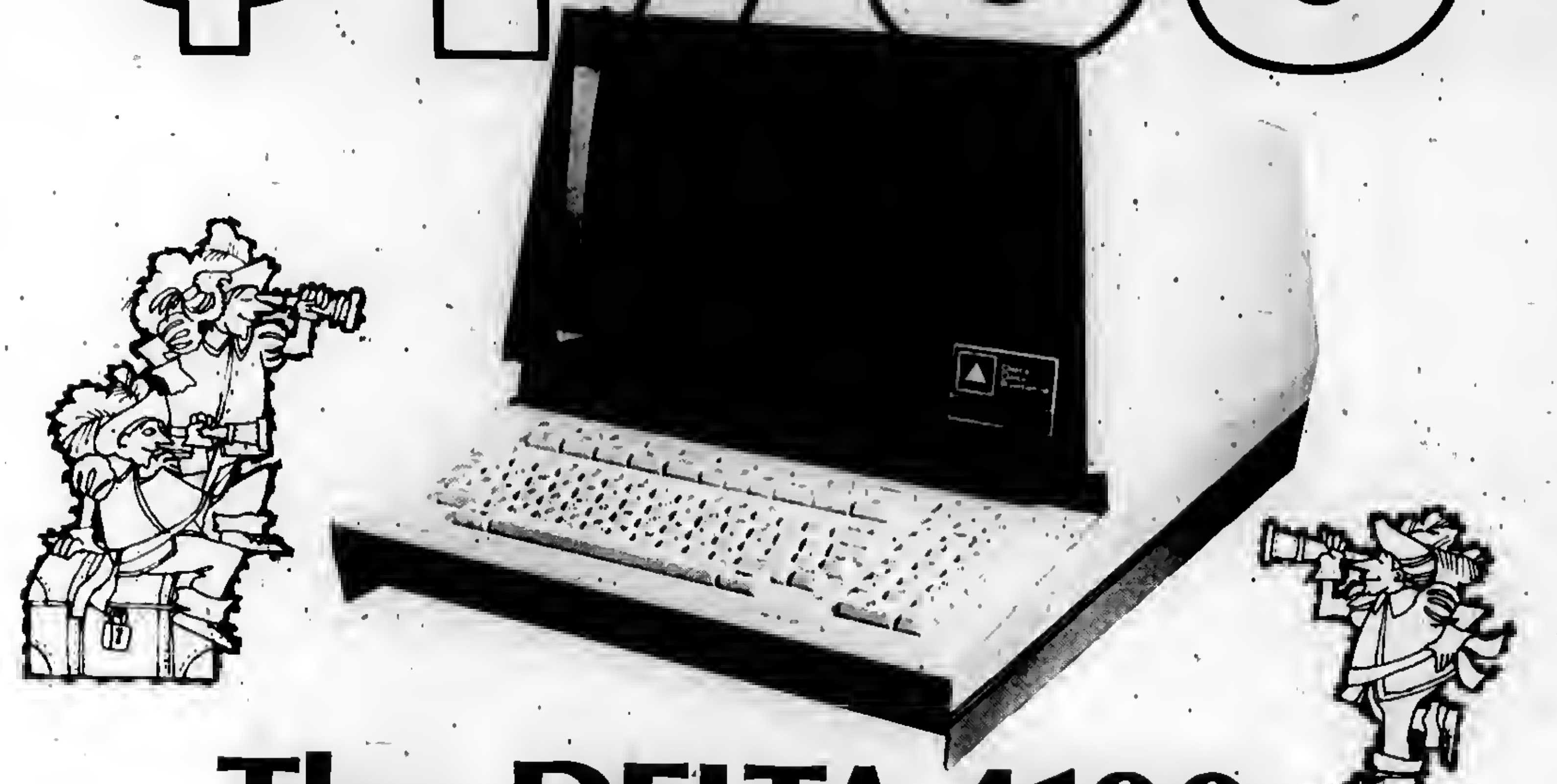

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Suggests Corporate Task Force

Privacy Nothing New, Lawyer Says

By Ann Dooley
CW Staff

NEW YORK — Concern over privacy is not a new issue, according to Marilyn Maledon, assistant general counsel for Rockwell International.

Privacy was brought up as a legal issue for the first time in a Michigan state court in 1868, when it was declared a constitutional right by Justice Thomas J. Cooley, she said.

In 1890, Supreme Court Justice Louis Brandeis ruled an individual had the right to be "left alone." The right to privacy was again upheld in the 1965 case of Griswald vs. Connecticut, which stated the right was protected under the first, third, fourth and ninth amendments, Maledon told an American Management associations briefing on privacy here recently.

No Definite Stand

The 1970 Fair Credit Reporting Act was the first time Congress addressed the question of privacy with regard to information, the lawyer noted. In 1976, however, the Supreme Court examined privacy from an information aspect and declared an individual has neither a legitimate expectation of privacy nor a "protectable interest" in his bank records in the case of U.S. vs. Miller, Maledon said.

More and more lawsuits are coming before the courts using an argument of right to privacy, she said. While the courts have no hard and fast viewpoint about what privacy is or isn't, it is generally agreed that individuals do have certain rights and that courts and legislatures will use a balancing approach, Maledon said.

Therefore, companies had better be able to justify the actions they take, she warned..

Self-Regulation Advantages

The advantages of self-regulation from a business standpoint include the fact that a company will be able to tailor its regulations to the organization's own needs, Maledon said. A company knows best how to put its own house in order — certainly more than a government that can only issue broad orders, she noted.

Voluntary cooperation also emphasizes an employer's concern over employee welfare, she said.

One problem with voluntary compliance is that an employer may go beyond the point of what is necessary, according to Maledon. In addition, this approach would leave employees with no place to bring their complaints outside of the company.

It is more difficult for an organization to enforce a rule when there is no legal obligation, she added.

In addition, some organizations would end up doing more than other organizations of the same type, which could end up being disadvantageous, she suggested.

Self-regulation does not mean doing nothing, Maledon said. Corporations should act as concerned citizens and have a firm, long-term commitment of social responsibility, she contended.

Corporate Task Force

Each business should establish a privacy task force tailored to the needs of the organization with top personnel participating, Maledon said. The task force should review existing policies and practices of data collection, maintenance, use and dissemination, she said.

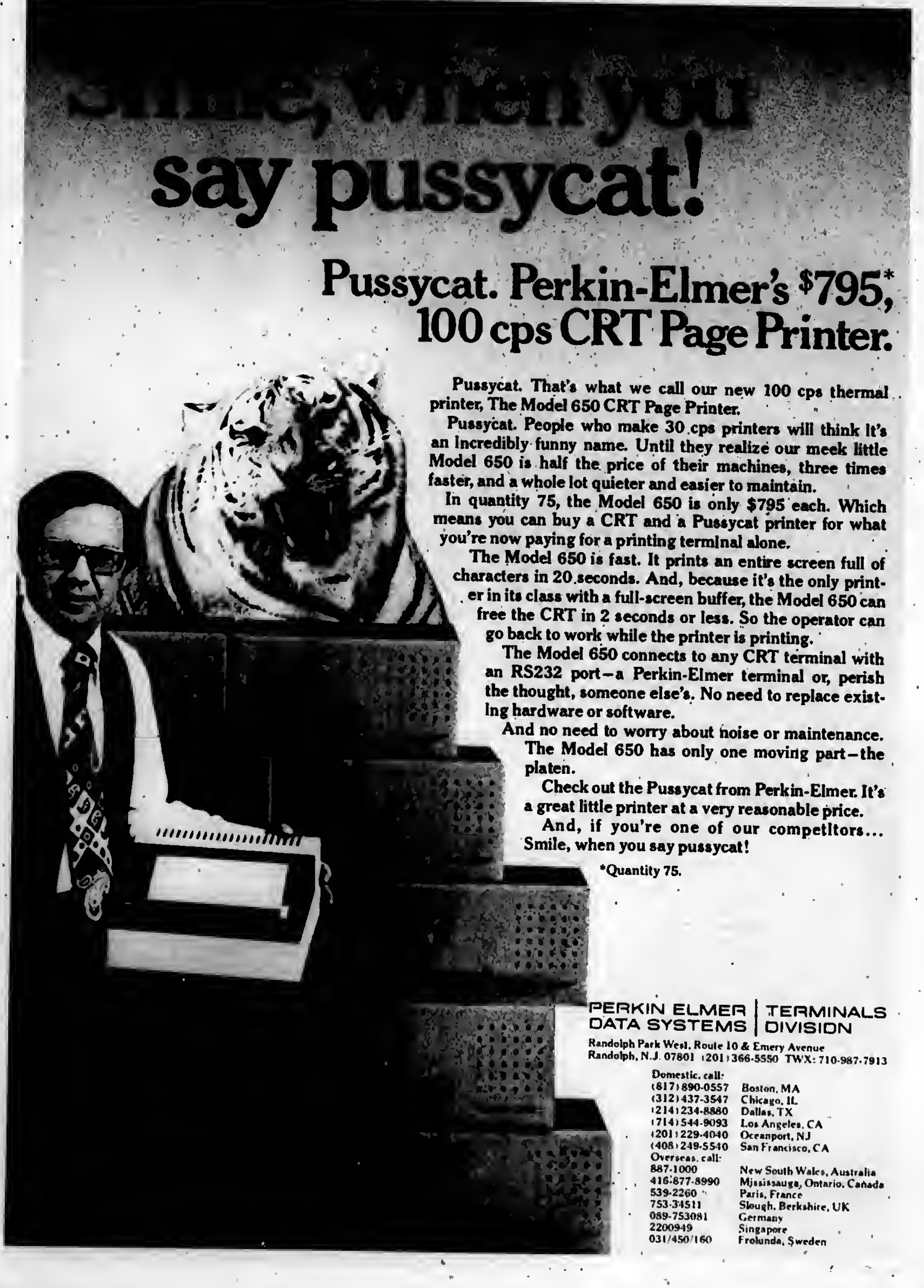
The group should implement the recommendations of the Privacy Protection Study Commission and serve as a focal point for all privacy information matters within the company, the attorney suggested. It should also review external factors which may influence the company's policies and also promote awareness of the confidentiality of information within the company.

Before formulating policy, an organization should understand the difference between privacy, confidentiality and security, Maledon pointed out.

CW Photo by A. Dooley

Marilyn Maledon

Policy could follow Department of Health, Education and Welfare (HEW) guidelines or the privacy commission's recommendations.



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Editorials

The Real World

While economists and lawyers drone on in New York, attempting to show IBM's power in the computer marketplace, that power can be clearly seen in the real world of systems announcements over the past few weeks.

By its price-cutting action with the announcement of the 3031 and 3032 processors, IBM established a new price/performance curve. Now all the mainframers are rushing to market products that are competitive.

The first reactions, of course, came from the plug-compatible CPU manufacturers, with Itel bringing out a new Advanced System.

But now Burroughs has jumped into the fray with the B6817 to compete against the 3031; Univac, too, has announced three machines to compete in the new marketplace.

All of these reactions are clearly related to the IBM products, and the firms involved admitted as much by making such comparisons in their press releases.

Clearly, this shows IBM's power to sway the market. Few, if any, react when Honeywell, Burroughs, Univac or NCR brings out a new series of mainframes, but all, or at least most, react when IBM does the price juggling.

Of course, this activity gives users more choices and potentially lower prices, but users always seem to have to wait for IBM to make a move before any of the other firms offer those options.

In a truly competitive industry, the other manufacturers would constantly offer product and price improvements and wouldn't wait to play "follow the leader."

Dema's Tough Job

The year-old Data Entry Management Association (Dema) recently held its first conference. The gathering drew over 300 front-line data entry managers and supervisors, the first time such a group has ever gathered under one roof.

Quite a bit of excitement was generated in the sessions and in the workshops, where the managers were able to discuss with each other the common problems and headaches of their profession. Turnover, training, motivation, vendor support and distributed data processing were the key phrases of the day.

Dema wants to assume the role of change-maker in the area of data entry. Its areas of concentration include education, standards, professionalism and attitudes.

Dema's goal is noble, but changing the attitude that data entry consists of "a bunch of girls on keypunches down the hall" will be no simple task. Such attitudes are deep-rooted and change is very slow to come. The same problem will be faced in the areas of certification and professionalism.

Yet, it is refreshing to see a professional group bent on making sweeping changes in its field, and hopefully the changes will come more easily than usual and the results will be satisfying.

It will be interesting to visit next year's conference in San Diego and see what changes Dema has brought about during its sophomore year.

Data Past

Five Years Ago
Nov. 1, 1972

WASHINGTON, D.C. — A study conducted by the Canadian Department of Communications concluded that although most people appreciated the benefits of computers in the economic and scientific areas, there was still a "latent fear" of depersonalization and loss of control over decisions affecting their personal lives.

— — —

WASHINGTON, D.C. — The Supreme Court reconvened hearings on the issue of software patents. Officials could not predict when a decision would be forthcoming in the Benson-Tabbott patent case.

Eight Years Ago
Nov. 5, 1969

NEW YORK — The Business Equipment Manufacturers Association's Plan and Policies Committee without warning dissolved the X3.4 Standards Subcommittee on Common Programming Languages.

X3.4 was created to allow users and other technically qualified persons a forum and the authority to exercise competent control over the progress of language standardization.

— — —

HAWTHORNE, Calif. — The Magne-Head Division of General Instrument Co. introduced the Diskstor 505, a fixed-head drive with a removable disk.

The unit used the Diskpac 005, a plated disk with a 5 million-bit capacity, and the Diskstor 500 disk drive. The disk drive could handle 8-, 12-, 16- and 18-bit words in parallel and offered an average access time of 8.7 msec, the company said.

'Warn't 'Nuff to Put a Roof on 'Er — Now They Want Privacy an' Security to Boot!'

Letters to the Editor

With 'Help' Like That . . .

I am a convict in a state penitentiary. This letter is intended to offer some personal input about the government criminal data systems.

My crime was one of unwarranted violence, about six years ago. I am due for release this winter..

About a year ago, I chaired an institution Jaycee chapter committee whose goal was to match individual releasees with an outside Jaycee chapter to ensure the ex-convict's success in resocialization. My work brought me in contact with several chapters, one of which eventually became interested in "helping" me. This chapter is 200 miles from my home town, where I committed "my" crime.

My wife was invited to a community meeting to introduce herself and to discuss the Jaycee program. This "high-rent district" chapter had its quota of doctors and lawyers, one of which worked in the local district attorney's office.

My wife arrived at the meeting to find that the lawyer (in a spirit of helpfulness) had decided to expedit getting to know me by ordering a complete criminal file printout and laying it open to the 50 members of the chapter and their families.

During later discussions with my wife, we determined the record incuded all arrests during my life; several references to incidents of which neither of us was aware; confidential psychological evaluations; and opinions of my character written by a prosecuting attorney preparing to bring me to trial in 1971.

Though the prison experience has helped me to not feel ownership of my body or "private" information, my wife, with a citizen's mentality, refused further contact with the Jaycee program.

As a side note, I became a computer programmer and worked through the mail to finance psychological therapy over the last six years, as well as contribute to my wife's support. I thereby "accidentally" became this state's first convict to get a college degree from inside the pen.

While I agree with the position that criminality does not belong in business data processing, neither does criminality belong in the community. The problem is to differentiate between humanity and criminality and selectively destroy only the latter.

(Name Withheld by Request)

Simple Language, Please

Just read Frank Binder's sophist clap-trap on education ["DP Education Worthless in Everyday Use," CW, Oct. 3]. Please print this letter to him:

Dear Frank:

Just read your dirge on schools. It shows quite well that you are bright, but it does not show that you can write your thoughts so we plain souls can tell what you mean.

Too bad you used our tongue that way. It is rich with phrase, verb and noun which give us all much room to state our thoughts so they are clear to all who read or hear them.

I teach and write in this field, thus make my way by means of speech and prose. I ask you, Frank, please tell me in short words what you have in mind. It might help me be sure I don't cause those who come my way to leave with such a bad taste as you have given me.

By the way, Frank, I tried not to sleep through your "school." I failed.

Nate A. Newkirk

Mt. Kisco, N.Y.

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Even DPers Can Be Replaced by Machines

The Human Connection

By Jack Stone
Special to CW

It was at the semiannual conference of the Computer Management Association (CMA), a mid-October affair in Pittsburgh, that I met J. Bert Heuerman. As president of CMA, a Honeywell User's Group, he invited me to the meeting to speak on "Managerial Leadership."

His full-time job is that of administrative services manager for the Questor Corp., headquartered in Toledo, Ohio. As we chatted, we learned of our common interests in DP management development — he held forth with a management workshop as part of his strong commitment to this area.

One of the issues that came up in his workshop was general concern about the growing "impact of automation," (know the phrase?) upon the jobs of, if you can believe it, data processing personnel! Naturally, I pooh-poohed such thoughts, because I fervently believe in the heaven-sent law on the employment of DPers which states that the current universal need for our wonderful people will extend into perpetuity.

But after interviewing Bert, I'm frank to say that I was troubled with some nagging doubts.

Q: Bert, do you really feel that some DP personnel in computer centers will lose jobs over the long haul?

A: I really think it is inevitable that there will be a substantial reduction in these jobs in coming years. But as history has shown in other industries where automation has hit, those affected generally find jobs elsewhere. I believe that affected DPers will move away from the large centers into data processing activities which will undoubtedly grow in the user organizations or in vendor companies. And I can suggest some indicators that tend to justify my projections.

First, a number of my friends in large centers are beginning for the first time to think about broadening their skills and capabilities in anticipation of a future personnel crunch.

Second, the image of the centralized computing facility has been largely tarnished in the eyes of influential users and executive management. For example, I think that one of the major reasons for their mad rush into minis and micros has nothing to do with technical or economic considerations — they simply want their own machines to end the long-term communications problems they have had with the DP departments.

Third, there have been many developments in both the industry and the technology which, when all are viewed together, tell me that head count in a centralized operation simply has to fall.

Q: Would you give me some examples of such developments?

A: Glad to. Turnkey software packages. The simple fact is that any DP manager worth his salt recognizes that he must seek out packaged software alternatives to counter increasing costs for in-house personnel. When outside software fits and the vendor can properly perform the maintenance function, the cost savings can be enormous. From one perspective at least, packaged software is automating the classical functions of development and maintenance programmers. Surely you can visualize how personnel growth in in-house DP departments will be stunted as the software market burgeons.

Here's another example. Let's examine what data base management systems (DBMS) are doing to the jobs performed by applications programmers. The DBMS makes it possible to vastly reduce the amount of programming effort required to support a major installation.

I recently heard of one very large operation, with hundreds of programmers, that made a study of what the programmers actually did. It turned out that only a small percentage of them used standard programming languages — the vast majority served the users by framing queries against the data base, a task that can be performed by lower skilled personnel.

Q: How do you think machine operations will be affected?

A: Competition is forcing the mainframe vendors to automate the production flow in every way possible. It is clear to everyone that truly low-cost mass storage is just around the corner. Everybody is thinking in terms of permanently mounted direct access facilities. What happens to the need for people to handle tape and disk mounts?

System reliability continues to improve as hardware maintenance becomes automated and as more of the operating system gets converted over to microcode. Shouldn't we expect a reduction in the need for in-house super-expert systems programmers and hardware debuggers?

And distributed processing systems surely will ultimately place job processing responsibility in the hands of the non-DP-oriented terminal user. What happens to the production control function?

Q: I can see some concerns about programmers and operations personnel, but certainly the analyst will always be there to perform his services on his appointed rounds.

A: Not so sure about that. Some day, if top executives have their way, systems development and operations will be performed using a uniquely generalized problem-oriented language — English!

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

One Person's Ethic May Be Another's Ploy

The Taylor Report

By
Alan
Taylor
CDP

Bill Getz, the General Services Administration's commissioner for data processing for the western parts of the U.S. and a well-known author, has come up with a reason for the many split answers given to questions on DP ethics in the recent SRI International workshop on ethics. The answer, he tells me, is that "one person's ethic is another person's ploy."

Unfortunately, Getz did not explain in detail why he reached this conclusion, or give any examples. However, listening to the discussion that went on at the Data Processing Management Association (DPMA) conference last month when Donn Parker reported on the SRI workshop, I could fairly clearly see what he meant.

Consider the question of program ownership, for instance. If a programmer personally develops a tool that no one else uses, can he take it to a new employer? Must he leave copies with the old employer if he does so? The workshop split on this problem — as did both the National Computer Conference and DPMA audiences.

It cannot be expected otherwise. Some who know what the law of the land is and how few property rights exist for programs will be inclined to recognize this by considering what legal right the old employer had to complain about the treatment he had received — which amounts to little or none.

Those who see themselves in the employer's position may feel wronged because manpower and machine time went into developing the "tool," and they feel entitled to the fruits of such labor, either exclusively or together with the new employer.

Others, feeling for the employee's position — not being asked to leave his private programs behind and not being offered any compensation for doing so — may feel that the employer's failure to take any action to obtain such programs is enough to put the employee in the clear.

In fact, each participant could come to a black or white conclusion based predominantely upon his particular view as to the rightful place of employer and employee.

Ethics Council

Getz, who is also the Society for Management Information Systems' (SMIS) ethics chairman, has come up with a preliminary proposal that an Ethical Standards Council be formed, consisting of about 25 to 50 representatives who would vote anonymously on selected questions and then have their voting records published. Not all votes would be taken by the full council, with some smaller groups of seven or nine normally being used.

The ethics council is certainly an interesting concept, and readers who are interested in supporting or developing it are invited to contact Getz at 105 Braemar Drive, Hillsborough, Calif. 94010. Personally, I think there is too much anonymity built into it, and while not against such an organization as a long-term solution, I still feel there is too much foot-dragging going on. Such time-consuming solutions are leaving the present generation of DPers without proper guidance.

Point of Agreement

As a test of my concept that we already have quite enough knowledge to start work with, I asked the DPMA audience the same questions from the SRI workshop, but added one significant variation: that the actions were, in fact, illegal, and that dissolved the split.

Whether or not the programmer knew that it was illegal, just about everyone — led by Donn Parker himself — voted that illegal actions were unethical. So our first two ethical and professional principles are already established and waiting to be worked on. As long as they are being ignored while "further research" is being conducted, the blame for prolonging the current ethical situation must, in my view, fall squarely on the proponents of "research first, maybe action later."

It is clear that DP people are simply uninformed as to what the law is — even as it applies to matters with which they work every day. For a professional to be and to remain so uninformed is unethical. It is simply being reckless in an area when others are involved. So, some means is needed to see that professionals know the law and know current ethical questions.

For professional organizations, such as those in the SMIS orbit, it would mean checking that employees are never put unnecessarily into the grey areas described by the SRI workshops' questions. Any DP organization that fails to define its precise rights and those of the professionals and the public with whom it deals should be understood to have protected all legal rights of third parties and surrendered all its own rights not explicitly and properly reserved.

Any DP organization that attempts to indirectly obtain rights not its legal property should be considered unethical and acted against accordingly.

The immediate acceptance and publication of these simple ethical items is the task at hand.

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Letters to the Editor

U.S. Didn't 'Win'

I would like to take strong exception to your coverage of the recent transborder data flow and privacy symposium held in Vienna, Austria [CW, Oct. 3].

As a member of the American information industry represented at the symposium, I must say that in no sense did the U.S. "win." Indeed, to broadly characterize the event as a "battle" where the U.S. group "pressured" a member of the Austrian government to "soften" his closing remarks only adds to the perception expressed by many of the countries' delegates that the U.S. information industry considers Europe a single extension (a 51st state) of the U.S. market with little regard for cultural and social differences.

American presence was certainly felt at the symposium via personal contact and excellent papers presented by our representatives, but papers and viewpoints made by many other of the 250 participants from most of the other 23 Organization for Economic Cooperation and Development (OECD) member countries — representing views such as ours and those vastly different — also had an impact on the symposium.

As an indication of just how we "won," it is understood that the committee of experts of the Council of Europe met (as scheduled) in late September after the Vienna symposium and has indicated that an international agreement concerning "data protection" will be enacted within two years [CW, Oct. 10].

Many symposium participants from different nations felt that two years was not enough time to properly study the matter so that the interests of personal privacy are kept in proper balance and in harmony with economic and free trade interests.

The OECD background document on the symposium as well as the speeches of various members of the delegations noted that the symposium was expressly intended to offer a forum whereby interested organizations and individuals could listen to diverse viewpoints and plans regarding the subjects of privacy and international data flow. It was my impression from all that was said that no one intended that the symposium would bring forth a firm resolution or action and this was, in fact, what happened.

For example, in the opening statement of G. Eldin, OECD deputy secretary-general, he made it clear that "no one expects this symposium to provide a complete solution ... There is reason to hope that it will constitute an important step toward clarifying those problems ... Members of the data bank panel ... are here to listen to you."

In summary, the sad truth is that U.S. industry has been caught with its pants down in this issue of privacy and the impact on its information sector in the world marketplace, and this symposium was the first time we have really been heard on an organized international basis.

We have many more steps to take to ensure a viable place in the future for our information products and services in other nations. Concerned firms should pressure our government to take a greater interest in this area and they should encourage citizens of other nations to contact their respective government entities in the interest of economical free flow of data across national borders..

Scott I. Brear
Santa Monica, Calif.

What About 'Float'?

Alan Taylor, in his column of Oct. 3, apparently made every effort to demonstrate to the world his lack of even an elementary knowledge of the banking system in the U.S. He questioned the payment to accounts in Chicago from banks in New York, intimating that, somehow, there is a moral/ethical problem with doing so.

Have you ever heard of "float," Alan? Probably three-quarters of the people with checking accounts use it on a regular basis when they make a payment by mail on Wednesday knowing that their account won't have the money in it until Friday.

He also notes that ". . . essentially, the application was inconveniencing some other, outside people to their financial detriment." It escapes me who these "outside people" could possibly be. Take my word for it Alan . . . Feel free to sleep tonight. There may be ethical problems around that are impacted by the DP industry, but this isn't one of them.

Paul J. Wilczynski
Randolph, Mass.

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Voyager's Minis Made No 'Decisions' Alone

By Terry W. Loar
Special to CW

Reader Commentary

The article entitled "System On Board Voyager Takes Its Cue From '2001' " [CW, Sept. 5] was replete with erroneous and distorted information. It also conveyed to the reader the impression that the Voyager spacecraft made real-time decisions contrary to the mission design. This is simply false.

We at the Jet Propulsion Laboratory (JPL) use very conservative and reliable design techniques with regard to our computer subsystems and their interaction with other spacecraft subsystems and the ground data system. The computer subsystems on-board Voyager are relatively simple and straightforward in their design and function.

There are no grounds for comparison between these computers and HAL. The Voyager computers are real and they employ accepted computing technology; HAL is fictitious and not feasible, given the current state of the art.

Three Subsystems

There are three subsystems onboard Voyager which use computers, and each consists of two redundant minicomputers. The Flight Data Subsystem (FDS) has the responsibility for collecting and formatting scientific and engineering data from other subsystems and sending that data to Earth. It is also used for controlling the scientific instruments.

The Articulation and Attitude (not altitude, as the article stated) Control Subsystem (AACS) keeps the spacecraft at the correct flight attitude by using celestial (the sun and the star Canopus) and inertial (gyroscope) references.

The Computer Command Subsystem (CCS) is an interrupt-driven minicomputer; it is the main computer and it performs two major functions.

First, it accepts scientific and engineering commands from Earth and stores them for future or immediate issuance to other subsystems. Second, it responds to interrupts from other subsystems which indicate significant events, some of which may be anomalous.

In the case of an anomaly, the CCS uses algorithms (which have been designed by humans and which are very well thought out) to determine the problem and to issue commands to work around the problem, e.g., to use redundant equipment.

The article alludes to the computer deciding that it "knew better than its human operators," that it "refused orders" and that it "took over control." I guess that the main computer (CCS) would be the culprit, if it were indeed possible to do those things.

This computer is identical to the Viking Orbiter computer. It is a 4K machine with 64 interrupt and level lines as input and an 18-bit command register (output unit) as output.

About two-thirds of the 4K is dedicated to flight software which does not change; the remaining third is used to queue up commands for future issuance.

There is no artificial intelligence or robotics involved and the computer does not have the ability to learn, nor does it have access to any auxiliary or mass storage.

The commands stored in memory are issued at precisely the correct time, with millisecond accuracy. These commands are simulated on the ground before they are transmitted to the spacecraft, and the ground controllers can observe differences between the simulated and the actual events, if there are differences.

There was, in fact, a maneuver abort during the first phase of the Voyager II mission, but it in no way can be attributed to a "failure" to follow "directions from the command center" or a "failure" to order a maneuver. In fact, it did precisely what it should have done — it put itself in a posture which precluded damage.

The capstone to the article, which caused many chuckles at JPL, was the statement that, somehow, the size of the spacecraft's antenna is related to the time that it takes a radio signal to reach Earth from Jupiter. Radio frequency energy is transmitted at the speed of light and is independent of antenna size. It is like saying that a smaller antenna at a radio station will cause a delay in the program.

The telemetry is not processed on a Univac 1108 as stated in the article; it is processed on Univac 1530s, 1219s and 1218s.

The U.S. space effort is currently experiencing a dearth of funding. The last thing we needed was an article which implied the incompetence of the designers and emphasized the apparently mysterious aspects of high technology.

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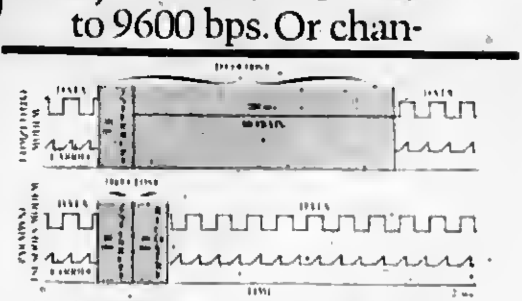

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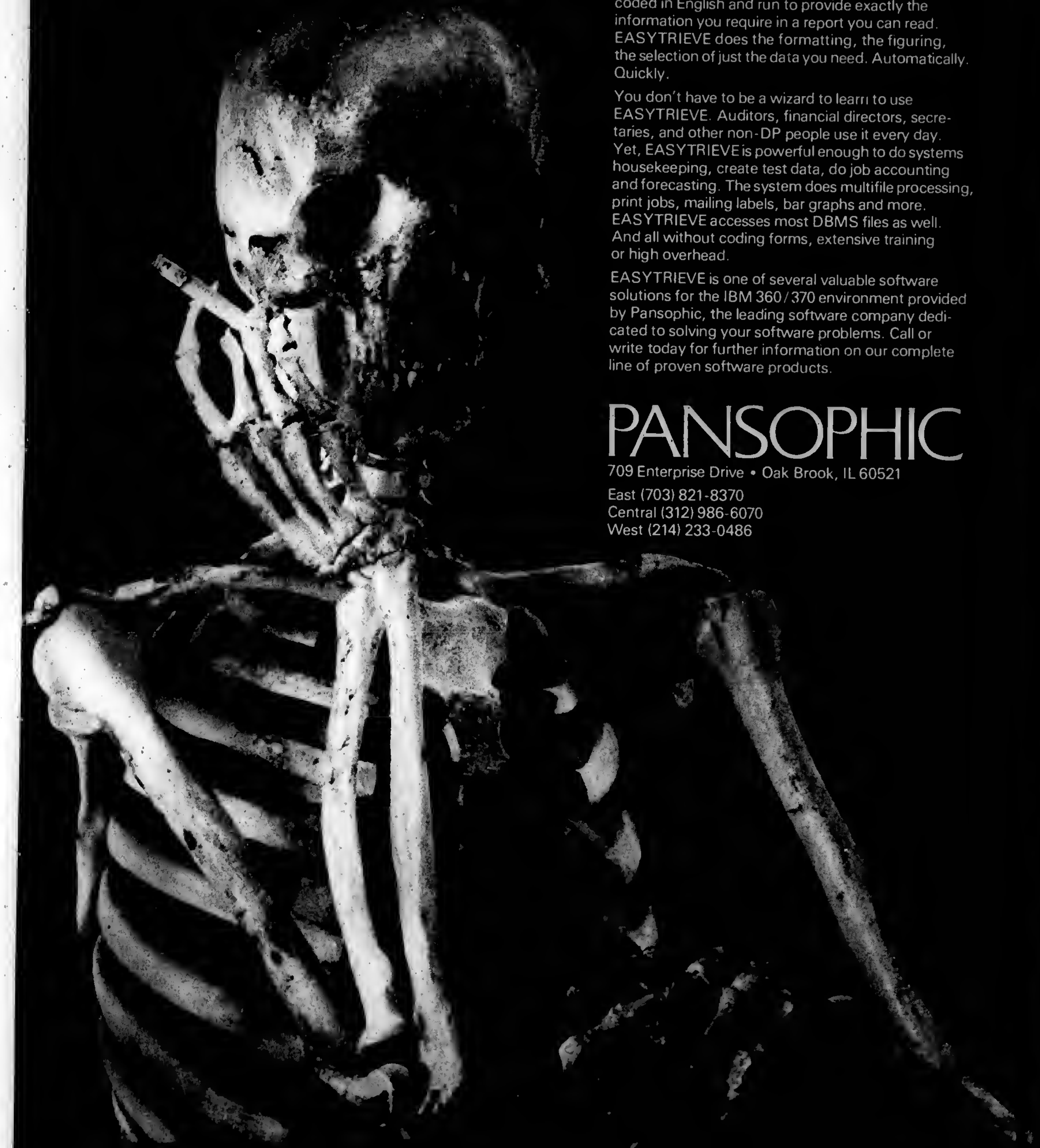

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ACM Panelists Disagree

Very Formal 'Specs' Praised, Panned

By Don Leavitt
CW Staff

SEATTLE — Panelists at the recent Association for Computing Machinery conference here disagreed about the amount of formality that should be used in setting the specifications for a software system, but not about the basic need for "specs."

Panel chairman Anthony Wasserman of the University of California at San Francisco opened the session on the evolution of specifications by noting that specs describe what a system is to do, rather than how it is to do it.

They provide a description of a system that fulfills a set of user-defined requirements and set the stage for the detailed design phase, Wasserman explained.

Although specs may be general or detailed, formal or informal, the professor said, recent trends are toward formality of system description and increased user involvement at this part of the software life cycle, apparently to ensure that what is proposed is really what the user wants — in detail.

There are multiple views of the system description, Wasserman noted, including a user view "for the person who needs the system but who isn't interested in algebraic notations," a program structure view which shows how to decompose a large problem into manageable pieces; and a "correctness" view to be sure the end product does what specs said it would.

Wasserman said he feels there is a need for both formal and informal specifications, but John Guttag of the University of Southern California disagreed.

Guttag argued that "informal is inadequate" since designers must know exactly what the specifications define. They must also have some objective measures of the completeness and consistency of the end product, he said.

Overly complete specifications are also dangerous, he noted, since they may include a number of features which designers can implement, but which are not really essential in the view of the people who requested the system in the first place.

Guttag said there are generally two classes of specifications. The models class include program text, mode modules created with unique specification languages and denotational semantics.

The axiomatic class encompasses "Hoare axioms," conditional equations and predicate transformers, he added.

In the future, he suggested, there may be combinations of these two classes such that specification writers might "translate user needs into some model domain and then use axioms within that domain."

For his part on the panel, Larry Robinson of SRI International asserted that design specifications should be associated with a mode of computation, should restrict the system that can be specified and should help to manage the complexity of the development effort.

All specifications should be formal, Robinson said, although informal specs can be used as motivational tools and nonprocedural specifications are helpful, too.

Formal specs lead to better designs, Robinson contended, noting this generally means more time is spent on design and the work is more difficult than the coding and other implementation efforts — but it's worth it, he said.

Stephen N. Zilles of IBM Research, San Jose, attempting to play the part of heretic in the discussion, said, for example, that formalism is not the only answer in specifications and then spelled out various difficulties with formal specs.

The difficulties, he said, are that formal specifications are not always attainable (since few people have the necessary math training), not always necessary (since some errors may be tolerable) and not always desirable.

Informal specs may be stated in terms that are more familiar, more readable and more concise in the view of the end user, he noted.

Users Must Accept Limitation Of Software License: Attorney

By Esther Surden
CW Staff

SEATTLE — Users — and not just their managers — should know the details of any software licensing agreements their organizations have signed, an attorney specializing in the field told a group at the Association for Computing Machinery conference here recently.

Failure to live up to the terms of the agreement could lead to withdrawal of the software by the vendor, Stephen Hollman, general counsel of Optimum Systems, Inc., warned. A license is a right granted to the user and a user who goes beyond the details of that right is using the software illegally, he explained.

Typically, the licenser will send a copy of the software on some medium to the person who is going to use it, regardless of who signed the agreement. The person who receives the software sometimes has never even seen the agreement, but that license can limit the user in such things as taking the software to a backup machine or making more than a set amount of copies.

Most vendors protect their software by treating it as a trade secret, Hollman noted. For example, if XYZ company allows a computer center to use a particular piece of software and that user makes what the vendor feels is an excessive number of copies of it, a court will look at four factors to see if that secondary distribution was illegal.

First, it will ask if the basis of the software is generally known or something only the vendor and the user knows. Next, it will ask what measures the vendor took to guard its secrecy.

Third, the court will want to know the value of the software to both the user and the owner, and finally the court will want to know how much money was spent developing the software.

Coverage Gaps

Some licenses have gaps in coverage for the user between the time that a new version of the system comes out and the time the user can accept the new version, Hollman continued.

There is no "good way" to police software, he added, but "I think there will be more policing."

Software taxation is another area in which users can find themselves in trouble, he noted. "You may find yourself with a large retroactive assessment" if the vendor has inserted a clause in the agreement making the user liable for taxes the vendor felt were illegal and therefore didn't pay over the past several years."

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LOS ANGELES — Two of the nation's largest title insurers believe they have found a way to gain better control over one of the most important aspects of their business, their cash flow.

A cash reporting system run from within United California Bank (UCB) enables Title Insurance and Trust Co. and Pioneer National Title Insurance Co. — both Ticor, Inc. subsidiaries — to receive information on the financial activities of their 140 branch offices throughout the U.S. the same day they occur.

The results are lower operating costs, increased accuracy and better control of the operation, according to Robert Sena, treasurer of the Ticor title insurers.

The companies use the system — designed by Rapidata, Inc. and run on that network's facilities — to transfer the daily deposits of each branch into concentration accounts at UCB here in Los Angeles. The system also reports disbursements on both a daily and historic basis and keeps track of accounting cycles, allowing Ticor to track the performance of each branch.

Before the system was installed, according to Don Perez, manager of branch accounting for Title Insurance, "each branch phoned this data into the home office, where it was manually transcribed, then keypunched for use by the in-house computer system. Transfer checks and management reports were prepared the next morning."

Now, however, the entire procedure is faster and more simplified," Marty Wool, assistant treasurer of Title Insurance, explained. "Each local office accumulates the required information on specially coded forms as it becomes available. They report this data any time between 7 a.m. and 4 p.m. by calling a local or an '800' number on their own push-button telephone and 'conversing' with Rapidvoice, Rapidata's voice response system."

Two features of the system ease the input of data. First, the spoken messages of both Rapidvoice and the caller are printed on coded forms. Secondly, the caller may choose either a "novice" mode, which repeats each entry, or an expert mode, which acknowledges each entry with a beep. The caller finishes by entering a hash total which is verified by Rapidvoice.

If an office discovers an error or receives additional data, a second phone call allows additions or corrections to the original data. A "back value" feature permits data to be entered for dates up to 30 days prior to the date of the call.

At 4 p.m. each business day, the system automatically stops collecting and starts processing the data. Several minutes later, it is ready to transmit the information directly via Rapidlink, Rapidata's computer-to-computer software line, to the in-house computer systems of Ticor and UCB.

Depository transfer checks are issued by UCB and financial executives of the Ticor Title Insurers can receive and analyze reports on financial activities before the close of that business day.

Dry Run

"Training field personnel unfamiliar with computers to use the system could have been difficult," Perez said, "but a novel approach eliminated many problems before they occurred."

A special training file containing a "dry run" of the input procedure was developed. Each office was then given time to practice dialing into the system and entering data using this substitute file.

The home office monitored this file to measure each office's progress in learning the system before switching the office over to it.

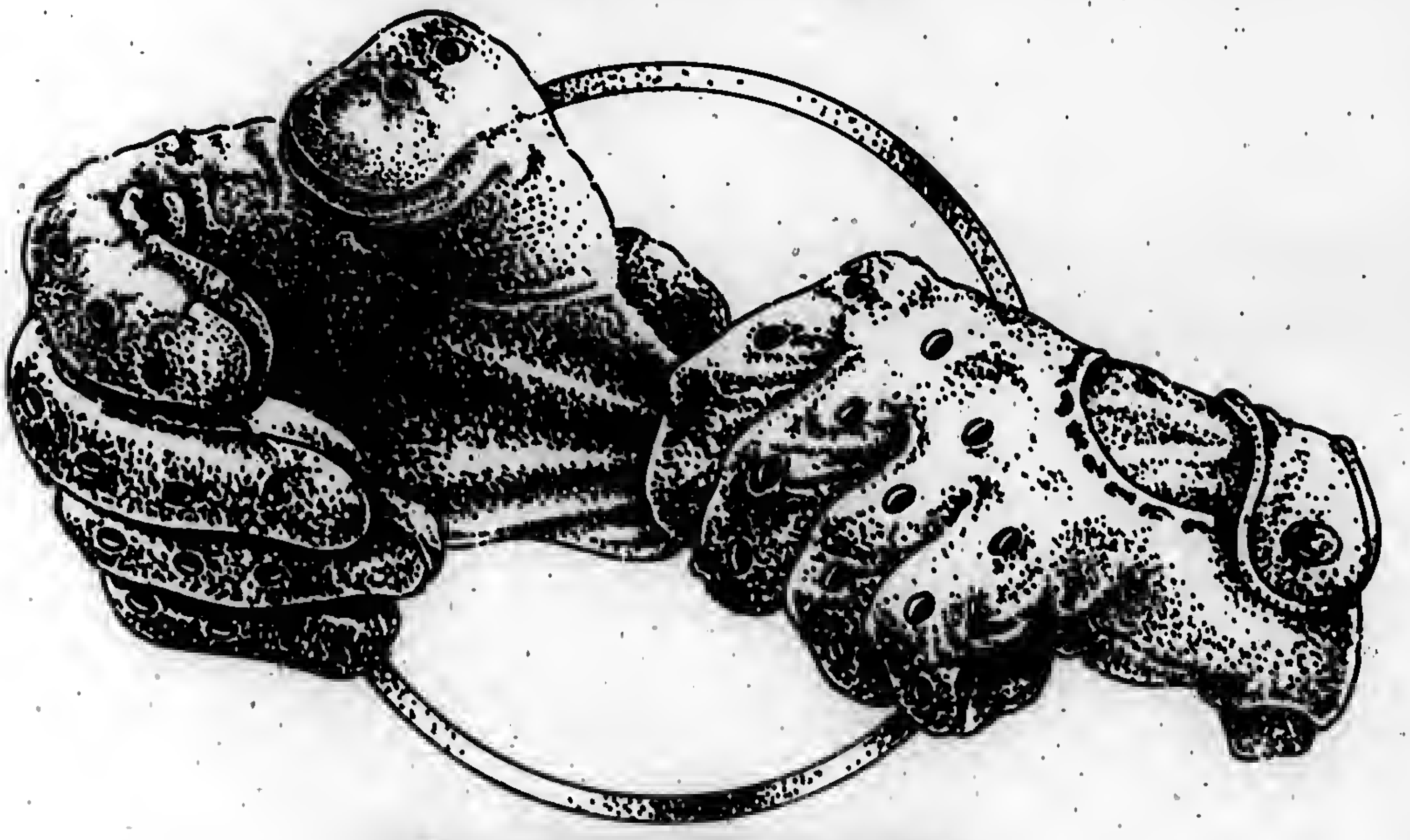
The entire reporting system is programmed in X2C, Rapidata's data management language. Because X2C collects more of the needed information in just one pass of the data, it reportedly results in fewer disk seeks, less processing time and less cost.

The entire system works on a time basis which permits certain operations to be performed only during specific time periods. The transactions are automatically written to two files on different disks. This creates a backup file which ensures that data will never be lost.

As a further safeguard, the main disk is switchable, allowing it to be attached to a second computer system if the first should ever become inoperable.

This combination of accuracy, efficiency and reliability has made this system an important asset to the Ticor insurers and their customers, Perez noted in conclusion.

Data Base/Data Communication



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'Itrac' Supports Transactions Run on Interdata 32-Bit Minis

OCEANPORT, N.J. — A software package that brings transaction processing capabilities to the Interdata, Inc. 32-bit mini line has been introduced by that firm.

Dubbed Itrac for Interdata Transaction Controller, the package features Cobol compatibility, interactive screen formatting and on-line screen form testing capabilities.

Designed for use both by OEMs and "IBM mainframe offload sites," Itrac was described as a product that "enables the programmer to focus on the details of his application."

The interactive screen-formatting feature allows Itrac to be "quickly" implemented by new users, the company claimed. A typical screen format takes about 10 minutes to design, Interdata said.

The screen design process starts when a user types a screen on the CRT in the format he wants. Data entry fields and user prompts are "marked" with a special keyboard character.

By hitting a "Send" key, the screen face is then sent to Itrac, which responds with a series of interactive, fill-in-the-blank screen forms. The forms solicit information for input data validation when the system is put in service, the spokesman explained.

An on-line testing feature enables the screen form to be tested before use. A utility called Modify allows specific changes to be made without affecting the entire screen.

The monitor works with any Interdata 32-bit processor that can accommodate 192K bytes of memory, a 10M-byte disk and one or more Model 1200 CRTs.

Minimum software includes the OS/32 MT operating system, Interdata's telecommunications access method and Cobol with Isam.

Itrac costs $6,500 from Interdata at 2 Crescent Place, Oceanport, N.J. 07757.

DEC CPUs Back Word Processing With 'ADMS'

SAN FRANCISCO — Word processing as well as DP capabilities are available to users of Digital Equipment Corp. Decsystem-10 or -20 mainframes who install the Automated Document Management System (ADMS), according to the vendor, Adapt, Inc.

With the package in place, users can manage an unlimited number of large and small documents interactively, a spokesman stated. Justification/hyphenation, automatic page makeup and page size flexibility are among the major features, he said.

Other word processing/text formatting capabilities supported by ADMS include footnoting, galley or page proofing and automatic numbering. Output options include photocomposition, typewriter terminals or microfilm, Adapt noted.

ADMS is "perfectly suited" for interfacing with current DP applications and such combined operations "will not greatly reduce" the total power of the CPU, the spokesman added.

He claimed initial users had prepared and phototypeset telephone directories, insurance forms and manuals, legal publication indexes and catalogs.

Others have used the package to prepare brochures and proposals, manuals, regulations and letters, he added.

The software functions under Tops-10 or -20 operating systems and is available now for $15,000 plus the cost of training the user organization and adapting the software.

Adapt is at 450 Sansome St., San Francisco, Calif. 94111.

Multifile Tapes Handled

NEW YORK — The ability to control each file on a multifile, multivolume tape library as an individual data set in a catalog is said to be the most significant feature built into Dynam/T, the DOS-DOS/VS-oriented tape library management system recently announced by Computer Associates, Inc.

The system performs automatic volume recognition (AVR) operations for any file on a multifile volume or volumes; having found the right file, Dynam/T positions the read/write head over the start of the file, regardless of what tape drive it is occupying, the vendor said.

Dynam/T logs exceptional occurrences for audit trail and accepts alphanumeric volume serial numbers, a spokesman noted. An early device-release feature permits immediate use of a tape drive by another partition and provides automatic release of tape-based sort work files.

The package supports control of an unlimited number of tape volumes and an unlimited number of tape file generations. It also provides reports on all tape activity.

Dynam/T can be acquired for $5,000 under a one-time license, but lease plans are also available, he said from 655 Madison Ave., New York, N.Y. 10021.

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MIAMI — From one small hamburger stand in 1954, to 1,877 modern restaurants and a $900 million-a-year business in 1977, Burger King Corp. has operated under principles of high quality, fast service and reasonable prices.

Dick Martin, director of planning and reporting for the wholly owned subsidiary of the Pillsbury Co., said today's competitive economic climate dictates a sophisticated data base management system in order to operate within budget parameters and ensure firm financial control.

"We have to know who spent what where," Martin said. "And the time when bookkeepers with arm bands and visors could efficiently handle our requirements has long passed."

That's why General Electric's Mark III remote computing service was selected to provide the DP power needed to handle the company's burgeoning capital budgeting and planning operations. Like most fast growing and successful companies, Burger King has to know exactly where its cash is going.

So in 1976, Burger King, in search of a sophisticated financial control system, turned to GE's Data Management System (DMS) for help with its financial control. DMS provided Burger King with the tools it needed then at a reasonable cost without unacceptable time delay, Martin said.

"But we needed more than that," he added. "We were looking for something with built-in flexibility, something that would grow as we grew."

Growth was indeed an important consideration in searching for the best system. Consequently, when GE introduced DMS II, an expanded data base management system, Burger King took advantage of the offering to upgrade its system.

"Since DMS II is upwardly compatible with DMS, very little time or effort was spent in making the changeover," Martin said.

This meant restaurant and department-level managers reaped benefits of the improved computerized system without being burdened with additional reporting tasks, Martin said.

Martin's operation is responsible for approving capital expenditures and the resulting cash flow of restaurants owned and operated or leased by the company and post-completion audits comparing projected and actual results.

In addition, similar financial data is maintained on the company's two service divisions, Distron and Davmor. Distron provides the restaurants with food and service-related products, while Davmor manufactures and distributes kitchen equipment and restaurant decor.

"In all, we have access to any of nearly 60,000 data elements literally at our fingertips," Martin said.

Basically, Martin uses DMS II to inform upper management of where each restaurant stands in relation to its approved budget, both in cash and financial worth.

Each month, input received on a weekly basis from the company's Real Estate and Operations Department is weighed against investment costs. Each restaurant's first three year's sales record, for example, is plugged into the data base and compared with projections, Martin said.

A restaurant's sales must reach and maintain a certain predetermined relationship to investment to achieve projected financial goals, he added. Thus, using an abundance of information related to sales and capital expenditure levels gathered by the company, Martin uses DMS II to perform a running analysis on this relationship.

In addition to the company's upper management, 175 managers responsible for departmental budgets receive monthly reports. Such reports contain information ranging from initial budgets and approved additions to actual spending and budget overruns.

Eventually, 20 separate monthly reports will be generated by the data base for the company's various financial planning purposes, Martin said. Through these reports, Burger King management is aware of such variable cost factors as land, equipment, building maintenance and landscaping and their impact on the company's investment.

DMS II is especially suited to operations such as Burger King's where multiple reports are required. Since more than one type of report can be generated in a single pass of the data base, Martin's operation saves both time and processing costs, he noted.

In addition to monthly reports, one-time reports are derived through the DMS II ad-hoc retrieval capability.

Martin cited several reasons for using DMS II, but simplicity of operation and flexibility were major strengths.

"My people who had no previous knowledge of computer systems and terminals quickly learned how to use DMS II," Martin said.

Another strongpoint of DMS II, according to Martin, is its interface with other GE systems. For instance, Martin uses Plot, GE's graphic display software package, and Fal II, its financial analysis language, to project restaurant construction costs by geographical region.

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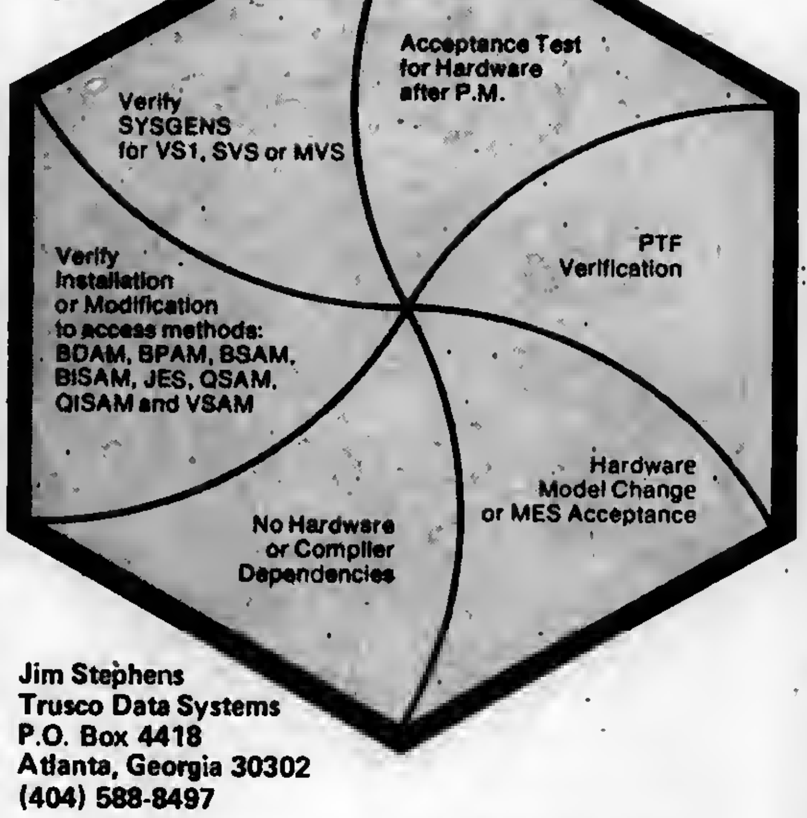
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CW10

Unit Moves Gradually to Data Base Integration

By Thomas Whalen
Special to CW

ANN ARBOR, Mich.— The Michigan State Housing Development Authority (MSHDA) is a state agency that furnishes low-interest mortgage money to provide housing for persons with low or moderate incomes. In order to carry out its operations and to answer legitimate requests for information from interested private and governmental entities, MSHDA keeps computerized records on multifamily housing developments, on residents of these developments and on borrowers in its single-family housing programs.

During the spring of 1974, the agency's changing needs required a revision in the contents of the Resident Profile System, which maintains demographic statistics on residents of multifamily housing developments. At that time, all of MSHDA's DP systems were conventional file processing applications run on ADP-Cyphernetics' Decsystem 10-based time-sharing service here In Ann Arbor.

However, it had become apparent that much of the utility of the Resident Profile System centered around special-purpose reports which were frequently needed on short notice. Much of the data for these reports was extracted manually from monthly printouts produced by the existing system; rush programming jobs were frequently required for the remainder.

This was expensive both in direct costs and in the disruption of other tasks by the rush jobs. In addition, the regular production of detailed demographic reports "just in case we need some of it" raised serious issues of privacy protection.

For these reasons, the agency elected to use System 1022, the data base management sytsem (DBMS) offered through Cyphernetics. The implementation went relatively smoothly. The

(Continued on Page 28)

Service Depends on DB/DC Combination

MINNEAPOLIS, Minn. — The sophisticated use of an integrated data base/data communications system by a small firm serving major U.S. "dealer banks" in the management of their bond portfolios is an example of the degree of specialization that is becoming more and more evident in DP applications.

"Almost all our customers have DP capabilities far more sophisticated than ours," Ed Warrington, president of Warrington Associates, said. "They utilize our service because it is better and more cost-effective."

Warrington Associates provides processing services and markets software products exclusively to bond departments of major commercial banks throughout the U.S. Formed in 1967, today the firm employs 16 persons.

At the outset, the firm did contract programming. In 1969, it began selling bank packages and in 1974 started providing its bond trading services to banks.

"We limit our customers to bank investment divisions," Warrington said. "We do portfolio processing, customer safe-keeping processing and bond and money market trading."

In explaining the importance of data base management systems (DBMS) and data communications software, Warrington pointed out there are only 200 or so "dealer banks" in the country that can utilize his firm's services. These dealer banks have bond departments or investment departments that do three things: buy and sell and trade on bonds and money market instruments; safe-keep these securities for their customers; and handle their own bank portfolio and assist other smaller banks in handling their portfolios.

"What we've done," Warrington said, "is automated this entire procedure. Even though these banks all have their own DP capabilities with set-ups far more elaborate than ours, they still rely on us because it's cheaper and better for them if they handled it internally."

In the Warrington operation there are two IBM 360/50s, each with 512K. A third IBM 360/50 is on order. One of the mainframes handles the on-line processing and the other is used for backup. Current volume at Warrington is 40,000 transactions per day.

Because data base management and data communications software is es-

(Continued on Page 28)

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User, Vendor Create DBMS

File System Handles Varied Types of Records

By Paul Teicholz

Special to CW

SAN FRANCISCO — Guy F. Atkinson Co., an international civil engineering construction company, was faced with a common dilemma of a medium-size DP user — what to do about data base for the present and the future.

For the last six years, the company has utilized an in-house conceived and constructed data base approach for all commercial systems development. This data base consisted of two types of files: a variable length Isam file for master records and a direct access chain file for transaction or detail records. Detail records are chained to each other and to a master record of the same key with forward and backward direct address pointers.

All access to the data base from an application program is through a CALL to a common access module that performs the appropriate data base function and hands the results back to the application program. This data base access module (Dbam-designed and developed in-house) has facilities for record compression and, operating in a "test" mode that displays records on the printer rather than updating the data base, permits testing with live files.

This combination of software allows efficient use of data base files, but has caused increasing problems as on-line systems were developed, as the size and complexity of requirements increased and the inherent weaknesses of the file access methods surfaced.

In addition, like most Isam files, performance degraded rapidly when multiple additions were made in one area of the master file. The need for additional security, more flexibility in accessing records (alternate keys) and faster performance led to the search for alternatives.

The requirements were straightforward: The existing CALL interface and Dbam functions had to be supported; the performance on a 370/-135 DOS/VS system had to be at least as good as the existing system; the new system had to be a frugal user of system resources; it had to be able to function concurrently in multiple partitions and on-line under a teleprocessing monitor (Task/Master from Turnkey Systems) with complete data integrity and password security; it had to support a flexible and efficient method for processing master records via alternate keys in addition to the existing hierarchical requirements; and it had to be easy to learn and use by application designers and programmers.

Narrowing Choice

Several existing file management and data base systems (Vsam, DL/1, Adabas, Total and IDMS) were extensively evaluated over the past two years, but were rejected because of performance restrictions on the existing hardware, difficulties in supporting the existing data base file structure, inability to maintain the existing CALL interface and high financial and/or resource costs.

Finally, a file management system called the Input/Output System (Iosys) from Jeffrey L. Walker & Co. of Mill Valley, Calif., was selected after a thorough and extremely successful benchmark against the existing data base. Iosys supports both keyed and sequential files.

Efficiency of all file addition, maintenance, update and retrieval functions is excellent (from 10% to 60% faster than the existing system, 25% to 50% faster than Vsam). Insertion of records into the file is done so that processing degradation does not occur and reorganization is unnecessary.

Additional Features

Jeffrey L. Walker, whose primary business is DP consulting, then agreed to define and implement additional data base features for Iosys. These included multiple key access (file inversion), interface with Task/Master, additional security and a data dictionary.

The inversion capability allows selection of those records that are to be accessible by an alternate index and versatile construction of the inverted keys. These enhancements are implemented through a functionally similar Dbam so that complete independence is maintained between the application program and the data base software.

Teicholz is manager of the Systems and DP department at Guy F. Atkinson Co.

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Michigan Unit Takes Slow DBMS Approach

(Continued from Page 26)

problems encountered were chiefly concerned with collecting the new data required by the agency and integrating the update process into divisional staffing and operations. Relatively few problems resulted directly from the transition to DBMS per se.

The system performed as expected in greatly enhancing and simplifying the production of ad hoc reports and eliminating the need for monthly general printouts. However, the large volume of additions, deletions and corrections each month led to update costs which were substantially higher than anticipated. Thus, although the agency remained committed to the data base concept, the systems group began a search for a more cost-effective way to obtain the benefits experienced with the 1022.

Pilot Project

In early 1975, Cyphernetics was apprised of the situation and it offered to make MSHDA a pilot application for a new DBMS called Information Processing Language (IPL). As in any pilot project, there were some temporary difficulties with various new features of the language, but these were all corrected soon after being discovered.

On the whole, IPL resulted in equal or better report generation and a substantial. decrease in update costs ["DBMS Language Ups State Agency Efficiency," CW, March 14]. The main disadvantage was the loss of host language capability, but the power of the self-contained IPL language has largely eliminated the need for a Fortran or Cobol interface.

The MSHDA systems group has been sufficiently impressed with the success of IPL in the Resident Profile System to apply it in other areas. The second application for IPL was another demographic system, Mortgagor Profile, which provides statistics on beneficiaries of the agency's single-family housing programs. Like Resident Profile, this system was also scheduled for a large revision, and it is also oriented primarily toward ad hoc reports. Thus, although there were many differences in detail, the two conversions were conceptually very similar.

The third IPL application was on the borderline between a revised system and a new one. In the past, the Management Information System was used to track the process of proposing, planning and building a development. This has now been replaced by the Development Information System, a new system with a family resemblance to the superceded one.

Self-Contained 'Enterprise'

Each of these systems was implemented on a separate Cyphernetics user number, providing a high degree of segregation between them. For purposes of updating and routine reporting, each system is treated as an entirely self-contained "enterprise." This has allowed the staff to use, test and become familiar with many data base tools and concepts and to reap benefits in the area of special reports, prior to facing the traumas inherent in agencywide data base integration.

As the first step toward integration, another user number has been reserved for "special requests" and given all necessary permissions and information needed to read (but not alter) any of the data bases. This arrangement serves several purposes. It makes use of the user security features provided by Cyphernetics to protect the data bases from damage; it facilitates accounting for the costs of special requests; and it provides a base of operations for examining the separate data bases for data discrepancies, redundancies and conflicts.

In the past, this last function has only been performed sporadically, in the process of producing special reports requiring data from two or more data bases. However, increasing experience in this area has made the need for closer integration apparent, and studies are currently under way to examine the desirability of creating a position of Data Base Administrator.

Tentative plans include developing a data dictionary, unifying the separate data base directories and combining the various auxiliary sets used by the three main data bases, prior to making any changes in the principal data sets.

Whalen is chief of information services for the Michigan State Housing Development Authority.

Service Uses DB/DC Support

(Continued from Page 26)

sential to Warrington Associates, they converted to the Datacom/DB and Datacom/DC systems from Insyte Datacom Corp., Dallas, Texas, in 1976.

"Before we installed Datacom, we were having all sorts of trouble with our previous software," Warrington said. "We were getting no support, unpredictable performance and inconsistent response time. "In a business such as ours, where our value to our customers is efficiency, we simply can't afford to have inferior software," he said.

"Before we purchased Datacom, we did a detailed analysis. A key to our decision was the fact that the Datacom was an integrated system," he added.

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French PTTer Says

Linking Packet Nets Next Standards Job

By Ronald A. Frank
CW Staff

ATLANTA — As packet-switched networks become operational, standards groups will direct their next efforts to the interconnection of these nets.

The current work of the Consultative Committee on International Telephone and Telegraph (CCITT) is aimed at establishing a packet internetwork standard which is presently designated X.7X, according to Jean Picard of the French postal, telephone and telegraph (PTT) authority.

Another issue that is becoming important is the interconnection of packet-switched nets with circuit-switched nets, Picard told attendees at a panel on international packet nets at the recent International Telecommunications Exposition (Intelcom 77) here.

It is not yet clear whether X.7X will be made available to users to interconnect private packet nets with public nets, Picard noted.

British Undecided

George Orchard of the British Post Office (BPO) said the UK does not necessarily favor either circuit- or packet-switched nets. There are now plans for a national circuit-switched net geared to digital equipment while another one, the EPSS network, will employ packet switching during a two-year test, he said, although EPSS will not be X.25-compatible.

Serge Wernicoff of Western Union International said one of the main roles of international record carriers (IRC) will be to interface the different standards used on each side of the ocean.

"If the past is any indication, the U.S. will not follow CCITT standards," Wernicoff said.

Speaking of the Data Base service inaugurated recently in cooperation with the BOP, Wernicoff noted this is a user experiment: "We cannot necessarily wait for standards. We must meet the needs of customers, even if this means we have to implement a service more than once," he said.

A session attendee asked the panelists why users are not better represented in international standards-making deliberations. Picard said it is often difficult to identify who the users of a communications offering really are.

There are very few large users that have a competent in-house technical staff, there are service bureau firms and finally there is the small user who wants simple, reliable, low-cost services, Picard said, adding the interests of these three types of users are not always in agreement.

The French Transpac network scheduled to begin service in 1978 was partly an outgrowth of the demands for a common shared network made by a French communications user group, he said. This group could not implement such a network because the PTT has a legal monopoly, so in-

(Continued on Page 30)

Network Planning Still an Art That Hinges on People: Survey

MINNETONKA, Minn. — Data communications network planning is still as much an art as a science, according to a recent study conducted by Data 100 Corp. and International Data Corp.

The study, which involved a mailing of 5,000 questionnaires, 70 telephone interviews and 35 in-depth personal interviews, found network planning is still more dependent on the talents and experience of the people developing the plan than it is on the use of a proven planning technique, the researchers said.

The existence of a comprehensive corporate plan for network development is the one exception. For the period from 1973 to 1976, 14% of the respondents surveyed reported their companies had a corporate plan for the development of their data communications network.

For the period from 1978 to 1983, the number rose to 22% with an additional 27% noting that they were formulating a corporate plan but its final form was not yet known.

For a large percentage of respondents, approving network applications on a case-by-case basis appeared to be an expedient solution to network development. In the past, 50% said network applications were approved on a case-by-case basis while 38% plan to continue approving applications on that basis in the foreseeable future — at least through 1981, the study results said.

Among the problems encountered in implementing a data communications network were hardware, software and people. Of the three, hardware appeared to be the least troublesome; only 7.4% of the respondents mentioned a lack of properly designed terminals that met their specific requirements as a major problem with 5.4% expecting it to be a problem in the future.

Software and people problems — "Sometimes hard to separate," the researchers noted — appeared to be the key factors limiting network development, especially development and implementation of networks with distributed data bases and distributed processing.

The most frequently mentioned problem was that the size and experience of the corporate DP staff was not sufficient to develop the necessary applications software. For the period through 1976, 31% said this

(Continued on Page 32)

HP Expands Net Capabilities; Links 1000, 2026 With 3000

By a CW Staff Writer

CUPERTINO, Calif. — Hewlett-Packard has extended its communications software to allow any terminal tied to an HP 1000 or an HP 2026 data entry system to interconnect with an HP 3000 Series II system in a distributed processing network.

DS/1000 brings to System 1000 users the capabilities announced for HP 3000 Series II users last May with the introduction of Distributed Systems/3000 (DS/3000) [CW, May 16].

DS/2026 allows the 2026 to function interactively, the firm said.

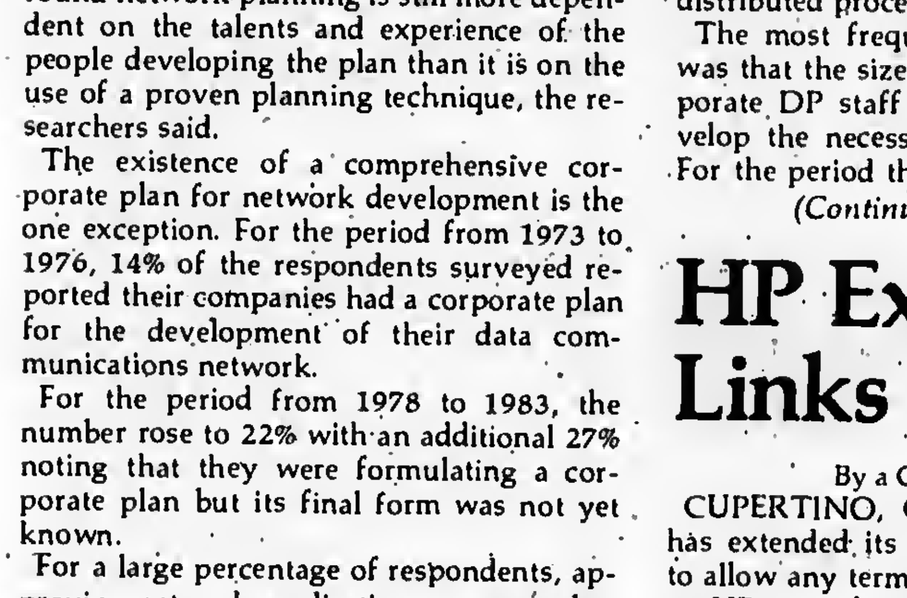
These systems, developed especially for entry and transmission of office information, formerly communicated only with one another or as passive RJE stations to large computers via standard IBM-compatible bisynchronous IBM 2780 or multileaving Hasp protocols.

The HP 2026 will be able to initiate transfer of an entire file since the new intercommunication link enables the console of any 2026 to act as an interactive, virtual terminal to the 3000. The 2026 can command the 3000 as if it were local, HP said.

Functions With DS/1000

New to HP small system users is the DS/1000 nodal addressing scheme, with store-and-forward capability at each HP 1000 system in a network. Now, at one node in the network, any HP 1000 can address any other HP 1000, using store-and-forward facilities, to communicate through any nodes that may intervene, HP said. This al-

(Continued on Page 32)



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Unit Monitors CRT Times

CLEVELAND — A microprocesor-based hardware monitor designed to compute, accumulate and print information on terminal response time has been announced by Computer Resources, Inc. (CRI).

Micromeasure monitors up to four CRT terminals simultaneously, recording response time, number of transactions, time of day, date, high/low responses and total time of transactions, CRI said.

Micromeasure costs $4,450 from CRI, 4650 W. 160th St., Cleveland, Ohio 44135.

Coates: Planning for Future Vital

By Kathleen Quinn
Special to CW

ATLANTA — Studying the future of telecommunciations is vital because "we now have mechanisms for predicting the future and for responding to it," according to Joseph Coates of the Office of Technology Assessment (OTA).

OTA is about to embark on a planning study to examine the public policy implications of telecommunications in a post-industrial society in which 50% of the work force is made up of information workers.

"We can now set and attain any goal we choose to," Coates said here recently. However, we are limited in that we can't do everything; therefore, "how do we allocate resources in a market-oriented society?"

One of the biggest problems with telecommunications right now is that the agencies controlling telecommunications are obsolescent, according to Coates. He cited the Federal Communications Commission (FCC) as an example of this.

FCC Geared to Broadcasting

The FCC is geared to broadcasting and has little or nothing to do with telecommunications, which is a huge new sector of the economy, he contended.

As a result, we have the "Petroleum Broadcasting System," as Coates called. the Public Broadcasting System (PBS), which he characterized as lacking drive, diversity and proper stimuli.

In addition, the FCC's "equal time in fairness" policy has led to programming "no more exciting than processed bologna." Controversy is limited to "two-bit arguments" over violence on TV and pornography, while the real problems of war, peace and internal decay are ignored, he added.

The Bill of Rights, too, may have become a victim of old age, Coates said. How can "freedom of the press," be interpreted, he asked, in an age when telecommunications inundates the press with so much information that in choosing what to print; it must also choose what not to print?

Defining Ownership

Another problem created by telecommunications is defining rights of ownership of information. This has surfaced in recent battles over software patents and copyrights, Coates noted.

"Planned disruption of our telecommunications systems is a danger for which we must plan, too," Coates said. "We must look also at the potential for torture and extraction of information afforded by telecommunications."

But, along with these problems, there are tremendous opportunities to be harnessed and used, he added. In its ability to link people of like concerns, telecommunications can create strong forces for social change.

Also, the opportunities in biomedicine, which Coates called "one of the greatest advances in medicine in the last 20 years," was made possible by telecommunications, he pointed out.

In answer to a question from the audience, Coates said that none of the concerns mentioned in his talk is presently being addressed by bills in Congress. Hopefully, the study on which his office is about to embark will help remedy this, he said.

Packet Net Link Next Standard

(Continued from Page 29)

stead it worked with the PTT on plans for the Transpac net, he recalled.

A similar process was followed in the UK, Orchard said, which led the BPO to implement plans for a packet net.

Another attendee asked what the carriers intend to do about data privacy and security. Picard said this question is concerned with the privacy of the data and also with control over access to terminal equipment operating on a network. In either case, the carriers have little control, he said.

Most of the panelists agreed the protection of data is not one of the concerns of a telecommunications carrier.

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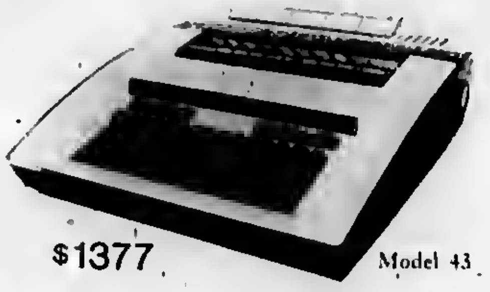

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Net Planning Still an Art

(Continued from Page 29)

was a major problem; 27% still see this a major problem through 1981.

Currently 10% of respondents see the lack of proven and reliable systems software as a major problem for network implementation. For 1978-1981, the percentage fell to 7%.

User Sophistication

The current level of end-user sophistication was seen in the past as a major bottleneck to network implementation, but in the future it is anticipated to be much less of a problem, according to the survey.

For the period 1972-1976, 28% of the respondents cited "corporate end user not yet ready to take advantage of network performance" as a major problem, but the percentage dropped to 14% for the future.

Another problem, according to the study, is corporate management's indecision on how and when to implement networks. Fourteen percent of respondents mentioned this as a problem in the past, and 18% anticipate it will be a major problem in the fuure.

The study also showed a clear trend to distribution of function, files and processing power within data communications networks. The trend of moving the data entry function closer to the source of data will continue through the end of 1978.

Those applications for updating files resident at the remote terminal and application processing by the terminal systems show the strongest growth through 1980 and beyond, the researchers noted.

When questioned about terminal requirements, respondents said they anticipate a greater use of minicomputers and terminals from independent vendors in their networks. While only 5% are currently using minicomputers, 8.6% expect to be using them by 1981.

HP Expands Net Capabilities

(Continued from Page 29)

lows a network to be configured as a star, a ring, a string or a combination of these arrangements. Multiple nodes can share links, reducing cabling or line costs, the firm added.

In addition, networks can be reconfigured without impact on previously written application programs since node addresses remain valid and accessible, a spokesman said.

The system also permits users to mix within the same network HP 1000 systems using disk-based RTE-III operating systems as well as those using RTE-M operating systems.

An HP 1000 user at any node is said to be able to access records in remote file on other 1000s or on a remote HP 3000 using simple calls.

DS/1000 supports I/O to remote HP 1000s and scheduling of programs in remote nodes via standard Fortran read/write statements.

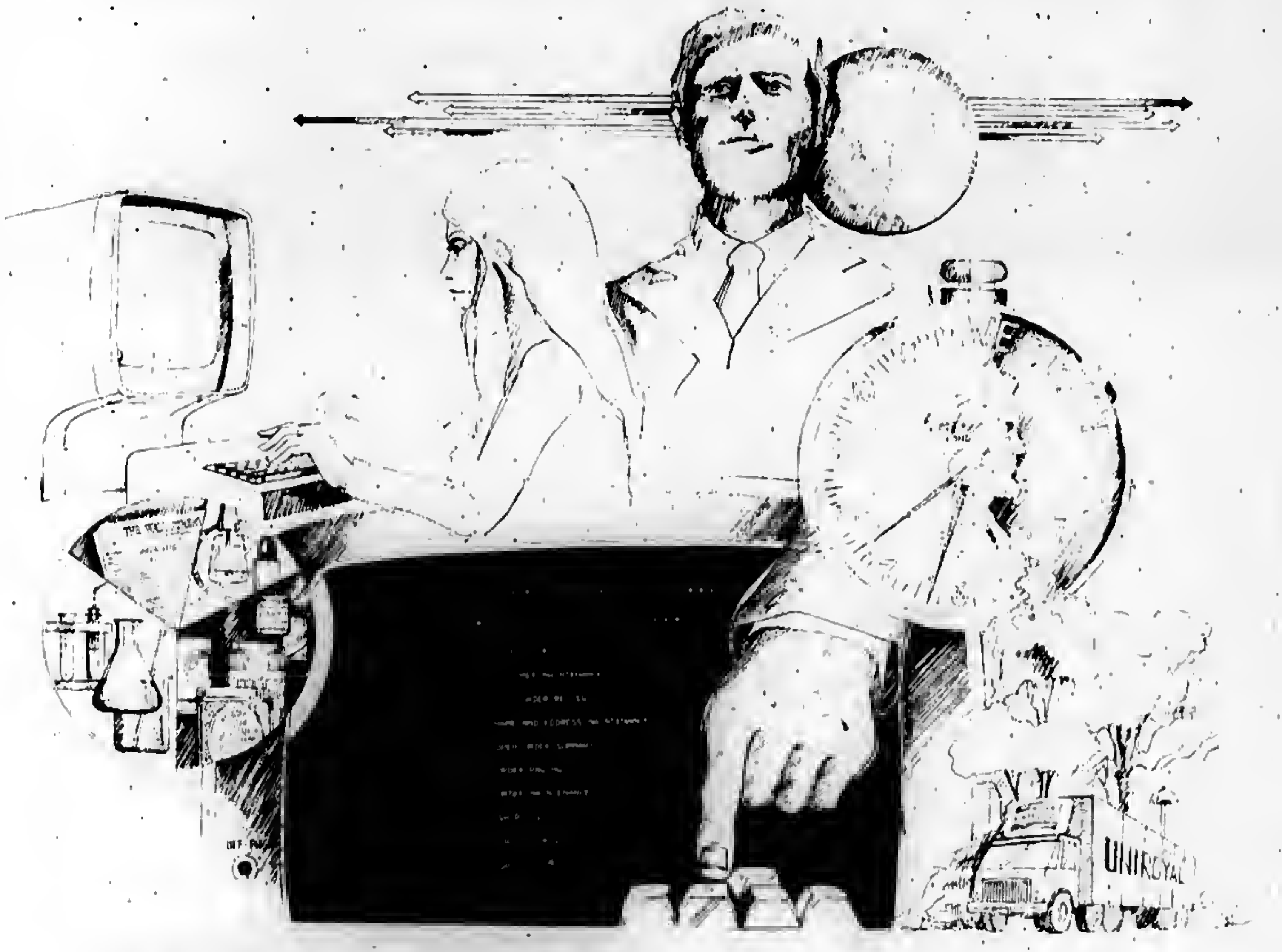
Printers and plotters at any DS/1000 node are therefore also at the disposal of the others via the interconnections.

Network communications on hard-wired or modem-based DS/1000 connections are protected by the use of VRC/LRC/DRC parity checking.

Such a distributed network is aimed at connecting R&D laboratory or manufacturing functions in a large organization with those of field sales offices to centralize the reporting of large numbers of dispersed and interrelated processing processes, HP said.

U.S. single-quantity list price for DS/1000 firmware and software to form one network link between two HP 1000s is $6,200. Additional links are $3700 each. The enhancement needed to link an HP 1000 to an HP 3000 Series II System is $500. First customer deliveries are expected in December.

The capability of linking the 3000 and 2026 is included in DS/3000 software, which costs $3,000 and which is available now, from Hewlett-Packard, 1501 Page Mill Rd., Cupertino, Calif. 94304.



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DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals

OLIS: A Powerful New Tool for Legislators

Prior to a session of the Oregon State Senate, staff aides Marcella D. Green and Gladys Johnson can check the status of pending bills, accessing the OLIS data base at an IBM 3277 Display Station in the Senate chamber.

In the Oregon State Capitol Building, in Salem, a Senator or Representative can step up to an IBM 3277 Display Station and learn the detailed status of any of thousands of bills pending before the state legislature: what committees have held or will hold hearings on it and when; what recommendations they made; how and when the bill was amended or otherwise acted on in each chamber; and when it will be called up for action again.

This information, referred to as Measure Status, is stored in one of two data bases included in the Oregon Legislative Information System (OLIS), an online computer system.

Generates Daily Calendars

The Measure Status subsystem helps schedule and manage the business of the legislature. It is used to generate daily and weekly Legislative Calendars with details of past and future activity on every pending bill, in committee and on the floors of the two houses.

"Without Measure Status," says Jason D. Boe, president of the Senate, "we would be hard pressed to keep track of the workload, to organize proper consideration of all the important legislation that comes before us. The computer is the ultimate legislative tool."

Adds William Stow, director of OLIS: "During the 1975 meeting of the legislature, the Measure Status subsystem was one of the factors that enabled the presiding officers to shorten the session to 153 days, compared to 180 in the previous session, despite a rise in the number of submitted bills from 2303 to 2449."

The other OLIS data base contains the complete text of the body of state law, known as the Oregon Revised Statutes (ORS), as well as all measures pending before the legislature.

By means of this data base, members of the legislature's staff can edit and proofread statutory language, working directly at 3277 Display Stations, entering all amendments to each bill as they are proposed.

To maintain this data base in the IBM System/370 Model 158, OLIS uses IBM's Advanced Text Management System (ATMS). Each new bill is entered via the keyboard of a 3277 Display Station or by means of an IBM Communicating Magnetic Card (CMC) Selectric Typewriter which can operate online, entering text directly, or off line, accumulating text on magnetic cards for later entry.

Simplifies Bill Editing

Some executive branch agencies have begun submitting bills already recorded on magnetic cards, which also serve as backup to the online data base.

ATMS permits material to be inserted, altered or deleted without rekeying of surrounding material, and with automatic renumbering of paragraphs and sections. For the 70 percent of all bills which revise existing statutes, ATMS can incorporate the unaffected language into the bill, avoiding manual entry and proofreading of this material.

A Text Retrieval subsystem of OLIS, based on IBM's Storage and Information Retrieval System (STAIRS/VS), is used for retrieving statutory material from the data base. It displays the desired portion of any statute, selected by subject matter or by key words in any combination.

At the end of each legislative session, the ORS must be set in type in its new form and printed. In recent years, as the legislature accomplished more work in each session, manual methods of typesetting and proofreading had begun to prove inadequate; the time required to prepare the ORS for printing had stretched into months, and the cost had mounted steeply.

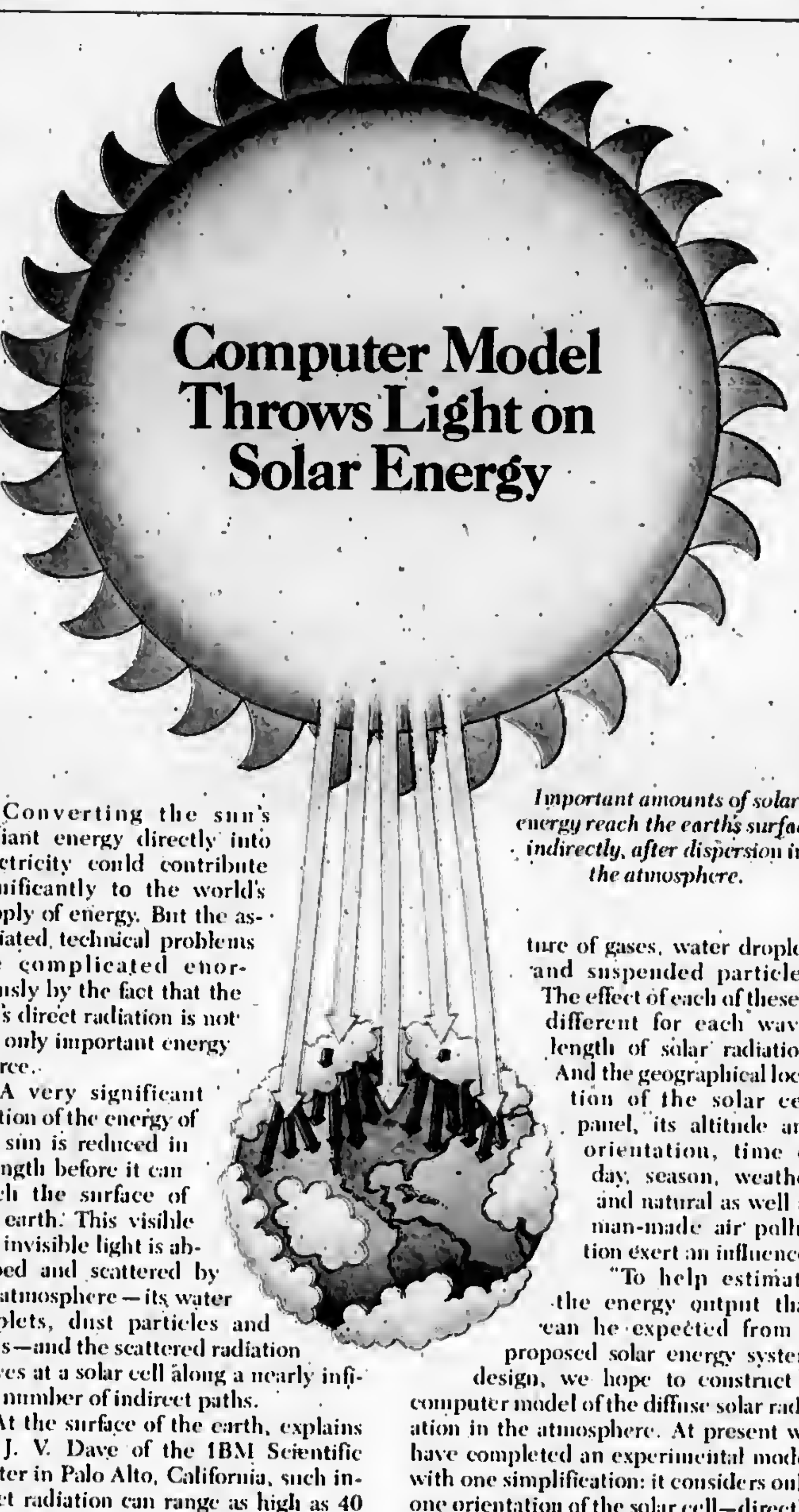
Now, at the end of a session, ATMS is used to incorporate the new and amended laws into the ORS, to generate a new ORS index, and to prepare for the required biennial printing of the ORS.

OLIS uses TERMTEXT/Format, an IBM program, to prepare material for the phototypesetter. Non-printing format-control characters in the text indicate to TERMTEXT/Format the required column width, type size and font, page and in-text numbering systems, page top and bottom matter and similar format details of the printed document.

"ATMS and TERMTEXT/Format work beautifully together," Stow says. "They were simple to incorporate into OLIS and they produce complex finished documents, remarkably free of errors, with very little wasted effort at the keyboard.

"After the session," he notes, "the ORS was printed earlier than ever before. And the cost was $300,000 less than our best proposal from a private company using phototypesetting."

Computer Model Throws Light on Solar Energy



Important amounts of solar energy reach the earth's surface indirectly, after dispersion in the atmosphere.

Converting the sun's radiant energy directly into electricity could contribute significantly to the world's supply of energy. But the associated technical problems are complicated enormously by the fact that the sun's direct radiation is not the only important energy source.

A very significant portion of the energy of the sun is reduced in strength before it can reach the surface of the earth. This visible and invisible light is absorbed and scattered by the atmosphere — its water droplets, dust particles and gases — and the scattered radiation arrives at a solar cell along a nearly infinite number of indirect paths.

At the surface of the earth, explains Dr. J. V. Dave of the IBM Scientific Center in Palo Alto, California, such indirect radiation can range as high as 40 percent of the total energy on sunny days, and 100 percent on mildly overcast days. A system utilizing all available radiation, he points out, can lead to a more efficient harvesting of solar energy under average conditions as encountered at various feasible locations.

Using the computer, Dr. Dave is experimenting with a solar energy model for a better picture of total radiation energy arriving at the earth's surface.

"We live at the bottom of a very complex atmospheric soup," he notes, "a mixture of gases, water droplets and suspended particles. The effect of each of these is different for each wavelength of solar radiation. And the geographical location of the solar cell panel, its altitude and orientation, time of day, season, weather and natural as well as man-made air pollution exert an influence.

"To help estimate the energy output that can be expected from a proposed solar energy system design, we hope to construct a computer model of the diffuse solar radiation in the atmosphere. At present we have completed an experimental model with one simplification: it considers only one orientation of the solar cell — directly overhead, at the zenith — a simplified, realistic representation of the atmosphere.

"Varying such parameters as time of day and atmospheric makeup, we have solved the radiative transfer equation for our models for several thousand data points. Allowing for our simplified fixed orientation of the cell, results show diffuse radiation is very significant in terrestrial cell performance. We are planning a model for an arbitrarily oriented cell using several million data points."

Software Products from IBM

Three products that extend the power of data processing systems:

1. Teleprocessing Network Simulator (TPNS) enables test and load measurement of terminal-oriented programs before installing terminals.

2. Conversational Monitor System (CMS) provides a full range of IBM interactive computing capabilties under Virtual Machine Facility/370 (VM/370). Supports program development and personal computing.

3. Advanced Text Management System II (ATMS II) is a conversational system that permits a terminal user to enter, edit, store, format, proofread and display text.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Dave Zeh

Dave is the System Family Manager of the NCR Interactive Family of Computers. He is a Purdue BSEE with 18 years experience in the development and use of computer systems. He is a key leader in NCR's Product Development Team. His management achievements include the development of the NCR 399 accounting computer and the starting of NCR-Wichita's development organization.

Niels Anderson

Niels, Manager of Advanced Development, has a Masters degree and 15 years experience in systems programming, technical management of software and hardware development. To Niels, the emergence of personal computing is the "tip of the iceberg" of the micro-electronics impact. Our challenge is to provide systems allowing the non-technical user access to information through new approaches capitalizing on cost/performance revolution and the ability to transcend disciplines to harness new technologies.

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System Family Management is a small group of senior computer architects with the responsibility of developing broad requirements for a family of computer systems and managing the relationship of the systems during development. Each staff member interacts independently with system developers and product managers to meet objectives. Two key individuals are needed in this area.

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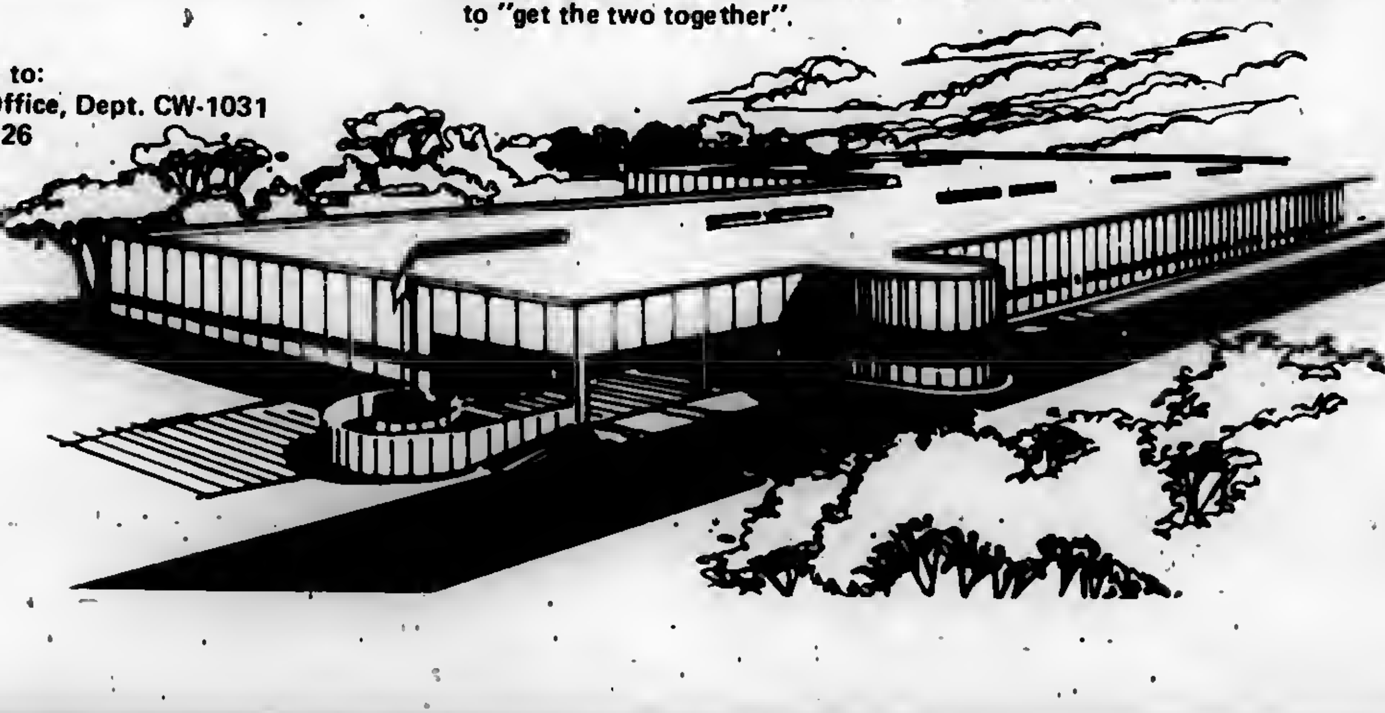

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Data Entry Conference Draws Over 300

• From Boiler Room to Waldorf

By Frank Vaughan
CW Staff

NEW YORK — "Data entry has moved from its traditional location in the boiler room to the Empire Room of the Waldorf Astoria."

That is how Norman Bodek, chairman of the First Annual Data Entry Management Conference, opened that recent meeting before a crowd of more than 300 here. Sponsored by the year-old Data Entry Management Association (Dema) and the American Management Associations, the conference drew participants from as far away as Spain, London and Singapore.

Explaining his opening remark, Bodek said for the past 20 years the data entry profession has been relegated to a position often both physically and mentally "down by the boiler room."

The conference marked data entry's exit from that situation — "We've come a long, long way," Bodek said as he looked around the mirrored room.

Bodek, who is also president of Key Universal Ltd., added that data entry has reached a new level of professionalism with the formation of an association and conference. The profession is changing every day, he noted, and the supervisor is no longer restricted to cards and keypunch.

Data entry is involved with tape, disk, interactive systems, CRTs, distributed systems and much more, he pointed out.

User Participation

The two and a half-day meeting emphasized user involvement with the attendees taking part through hands-on workshops and panel discussions.

In a workshop in which distributed data processing was the subject, a panel consisting of Bodek, keynoter Bruce J. Wright of Systematics, Inc., John F. Whelen of Entrex, Inc. and Ivor Brownlee of Blue Cross/Blue Shield of Indiana wrestled with the problems of definition, concept and implementation.

The panel also participated in a lengthy exchange on the subjects of validating data and maintaining productivity. During this exchange, Brownlee said it may be cheaper not to validate the data with an on-line system that gives 1- to 2 sec response times, whereas with batch-oriented systems it may be less costly to validate.

Wright noted that the equipment has to be considered. Users can do alphanumeric field verification before the data hits the line. After the data hits the line, the operator should pursue the critical errors, he suggested.

Productivity and validation are trade-offs and many times all the data entry department can do is to verify selected things, he said.

•'Arrows in Their Knapsacks'

By Frank Vaughan
CW Staff

NEW YORK — Like all those who forge new frontiers, data entry supervisors are finding "lots of arrows in their knapsacks," according to the keynoter at the First Annual Data Entry Management Conference, held here recently.

People involved in data entry have long been characterized as "just a bunch of keypunchers" and were comfortable with that description, Bruce J. Wright said. But, the director of communications for Systematics, Inc. noted, data entry people have been forging new frontiers in the past two years.

Back when he was first getting involved with data entry, and computers went down every hour without fail, Wright was told that "this is the keypunch area . . . where all the errors begin," he recalled.

Now, however, data entry management is in a position to start a revolution like DP has never seen before because "we are facing a challenge of management," he told attendees at the conference sponsored by the Data Entry Management Association and the American Management Associations.

The Challenge

"We are looking at systems the way they should be looked at. Systems are static. The beauty of a computer is that it does the same thing over and over.

"But if a business is static, it is going to be gone tomorrow. We have to overlap this static condition. Data entry is faced with feeding a dynamic business with a static means. That is the challenge," Wright pointed out.

"We have enough computing capacity to meet the needs of every business for the next 20 years. The real bottleneck is how to feed this technology to keep it as dynamic as the businesses," he added.

"How dynamic is a keypunch?" Wright asked. "There is nothing more boring than banging on those keys — boom boom boom — taking a break and doing it again."

Managers "face the task of going from the 'girls down the hall' image to the 'key-to-data entry' image."

Different Work

In the next decade, 60% of data entry managers will not be doing the same work, Wright predicated. Some 20% will completely change professions, 10% will be overtaken by obsolescence, 1% will die and the remaining 9% will be doing the same type of work, he said.

"You will be either a 'changer' or a 'changee' because the person

(Continued on Page 37)

Hot Stuff

This BASF Systems, Inc. data module Model 1335, which belongs to American Technical Industries of Mount Vernon, N.Y., recently came under fire — literally. Retrieved from a five-alarm blaze that ruined its plastic case, the module's 35 million bytes of stored data remained intact. The user was able to successfully dump the data onto another module and use the data in its DP operations.

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Data Entry at Seattle Bank

Mixed-Breed System Runs Like Thoroughbred

By Jeffry Beeler
CW Staff.

SEATTLE — Although it looks like a "mixed breed," the key-to-disk system in Seattle-First National Bank's credit card data entry department operates like a thoroughbred.

For two years, the system had consisted primarily of 27 video keystations that permitted only one mode of data entry. But, last August the bank supplemented five of the on-line keystations with optical character recognition (OCR) units to produce a "mongrel" data entry system that yielded 60% higher throughput than its "pure breed" predecessor.

And Don Ricker, the bank's assistant vice-president and operations manager, plans additional refinements that could boost the hybrid system's throughput even more.

The sequence of events that ultimately led to the union of optical and keyed data entry here began when the bank issued its first credit cards in 1966. At that time, Seattle-First used magnetic ink character recognition techniques to process its checks and credit-card sales slips.

Checks were read on "proof machines" and on a giant reader/sorter that computerized dollar amounts and produced batch checking totals.

Six years later, when it changed its credit-card billing system, the bank upgraded its data entry method to accommodate a key-to-disk system that included a built-in shared processor to speed throughput and balance batches. The new system easily outperformed the proof machines, but Tom Harkins, the bank's vice-president and manager of credit and collection, still sought a better data entry technique.

Too Expensive

Heeding his instinct to install optical scanning equipment, Harkins at first evaluated a large OCR data entry system that could read most of the bank's sales slips and leave the rejects for manual keying. But conventional OCR equipment proved too expensive and threatened to disrupt the bank's internal operations, Harkins concluded.

So the Seattle-First vice-president decided to replace his bank's original key-to-disk system with a more advanced model. Harkins reasoned that the proposed system would have to accommodate 28 keystations, incorporate an adding machine keypad to speed data entry and provide multiple balancing levels to ensure batch integrity of the sales slips, merchant batch and bank branch.

He also demanded that the alternative system provide a special routine that would automatically increment the reference number series for sales slips.

Based on these criteria, Harkins and his colleagues selected a general Computer Systems, Inc. (GCS) 2100 key-to-disk system, which they installed in August 1975. But although the replacement system delivered the additional capacity and programming the Seattle-First needed, he still regarded OCR as the key to the bank's data-entry future.

So Harkins helped form an informal evaluation committee that investigated equipment from several vendors and toured various OCR installations. It also outlined three major criteria the prospective OCR system would have to meet. Such a system, they agreed, would have to provide

(Continued on Page 37)

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Tandem has built the world's first multiple processor system, designed from scratch in both hardware and software, to provide non-stop processing—even during a failure—with no penalties in the speed, capacity, throughput or memory utilization of the system.

And it can grow without penalty. Starting with a basic two processor system, users can add processors, memory or terminals incrementally all the way to a fully expanded system of sixteen processors supporting 2048 data communications lines, with individual files of up to four billion bytes fully supported by a comprehensive data base management system. But the best part is that you never have to reprogram. Ever. Your Tandem NonStop System just gets bigger and better. At remarkably low cost.

Why the big ones fail.

The big mainframes are expensive to begin with. And even they can fail. Which can leave you high and dry in the on-line environment. But there are other difficulties with the big numbers, too. Of prime consideration in the on-line world, they offer very limited throughput for their price. And by the time you've hung a lot of communications lines on them, they suffer a derating which makes their performance even less attractive.

And whereas you may eventually need that kind of horsepower in your on-line system, chances are it's an expensive overkill at the outset. What you need is a system which will do the job efficiently on the way in, and grow as your needs grow, in modest price increments. It makes the big systems people wish they were more flexible.

One mini just won't make it.

Minis have made a name for themselves, justifiably. But in the world of on-line, where needs keep growing, the one mini system just can't cut it. With the architectural limitations inherent to a single mini system. growth can build system overhead so fast you'll grind to a halt before you know it.

And strap-ups will kill you.

The answer might seem to be to strap two processors together. One goes down, and the other takes over. Right? Wrong. It's not that simple. System software for a single processor system won't run on the strap-ups. And the fate of any transactions-in-process at the time of a failure is unknown. As is the state of any records being updated. And growth beyond the original system capacity is well nigh impossible.

What you really need is the one multiple processor system designed for multiple processor operation. Tandem's NonStop System.

The four major "on-line" considerations.

When anyone is considering an on-line system, regardless of size, there are four primary points to consider. Throughput. Availability. Data Integrity. Transaction Protection. The system must be able to handle the job. It must be there when you need it. You must be sure of the integrity of your data base. And you must be sure you don't lose or duplicate a transaction. Even during a failure. No single processor system anywhere can provide that assurance. It takes a multiple processor system designed for the on-line environment, and Tandem is it.

For better throughput, spread the files.

We built the Tandem NonStop System with geographic independence of programs and files. They're handled automatically under Enscribe, our Data Base Record Manager. And instead of having one processor with one bottlenecking channel and a

The Tandem 16 NonStop System is composed of multiple, independent processors with dual redundant communications paths. The unique interaction between Tandem hardware and software assures not only continuous operation, and the integrity of your data base, but also throughput unmatched by any other computing system of comparable cost.

Bank Uses Assorted Data Entry

The Seattle-First National Bank's credit card operation uses a key-to-disk system supplemented with OCR.

(Continued from Page 36)

a 100% back-up, have a minimal impact on the bank's current operations and demand minimum software and interface conversion.

After a five-month study, Seattle-First configured a mixed-media data-entry system that combined GCS key-to-disk hardware with Keytronic OCR units. Bank officials signed a contract for the system last February and installed two testbed units by the Fourth of July. After six weeks of trial operation, the system began regular service.

To operate the system, a clerk loads a set of merchant sales slips into the hopper of the Keytronic datareader, which scans each cardholder's 13-character identification number. The system then imprints this information onto the sales slips in the standard OCR 7B font.

A Motorola 6800 microprocessor in the recognition electronics verifies bank number and account number digits, controls timing and rejects spurious readings, and performs other housekeeping chores.

As each character passes under the datareader's head, scan lenses focus an image on a photodiode array. The datareader then photographs every 1/5,000 in. of the character being read and translates the image into electrical impulses. These values are compared with the OCR 7B font characteristics, and the recognition electronics identifies the character.

To further improve the key-to-disk system's performance, Ricker is considering redesigning the sales slips, modifying the bank's operating procedures or installing an imprinter that produces more machine-readable information than the current unit.

Get Arrows In Knapsacks

(Continued from Page 35)

who is sitting and waiting for it to happen will have it happen all over him," he told conference attendees.

Labor Intensive

Communications costs will drop about 11%, computer logic will cost 25% less, memory components will drop 40% per year and the cost of people will jump an annual 6% minimum. The most labor-intensive area of DP is data entry and it is the challenge of the data entry manager to change that area.

"We in data entry are the change agents . . . but we are reluctant to see our own bubbles burst. This is another of our challenges. We should use the turtle approach — slow and easy."

But, Wright noted, if the turtle never sticks his neck out, he will never get anywhere.

"The data entry manager has the opportunity to make a greater impact than any member of the company," he said. "Just pick up the pieces, look down the road and say: 'This is my time.' "

processor system anywhere an "on line" environment.

fixed priority system, Tandem's NonStop System distributes the work and the files across multiple processors, multiple discs, and multiple channels. Enscribe controls the pattern and the flow for maximum efficiency. Because of simultaneous disc accesses, there's a dramatic improvement in response time. It's one of the performance benefits about a multiple processor system which you can't get on a single processor system.

Ease of programming, by design.

Historically, multiple processor systems have been a bear to program. Not with Tandem. Guardian, Tandem's operating system, lets you write your programs as usual. You can add more processors, or memory, or terminals as you need them. No need to rewrite programs. Ever.

And we make it easy to write the programs in the first place, with COBOL or with TAL, a powerful language designed for fast, flexible programming. The software development tools of this mini-based system rival those of far more expensive systems, and include NonStop operation, data communications, mirror volume capability, full file protection, screen formatting programs, and a host of housekeeping utilities.

When you're thinking "on-line," think in Tandem.

Which means think in multiples. Few, if any, "on-line" systems can be installed and forgotten. The number of transactions, the number of terminals on-line, or the number of applications programs to be run on the system keep growing. Most likely, all three will multiply.

Which is traumatic unless you've started with the one system on the market which can grow with you—even if the growth occurs during the initial configuration phase—without having to start all over again.

NonStop growth and NonStop protection, too.

Because the Tandem System was designed for NonStop operation in both hardware and software, it offers an extraordinary measure of protection against a failure in any processor, I/O channel, disc drive, or in the software. No other system offers this measure of assurance.

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Each file may be up to four BILLION bytes.

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Envoy: Data Communications Manager.

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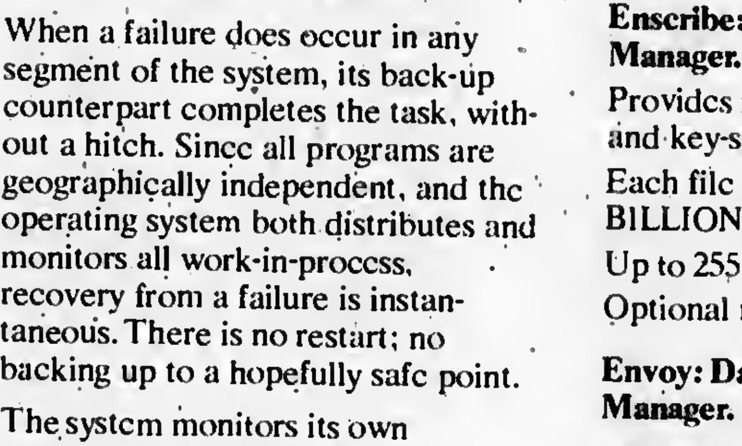
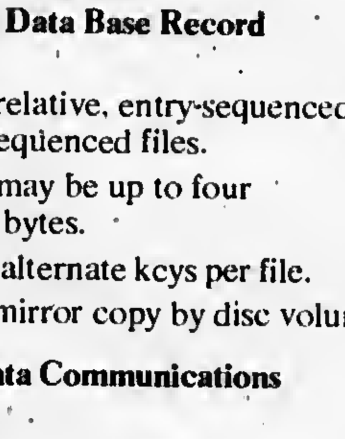
Toll Free 800-538-9360 or 408-255-4800 in California.

Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.





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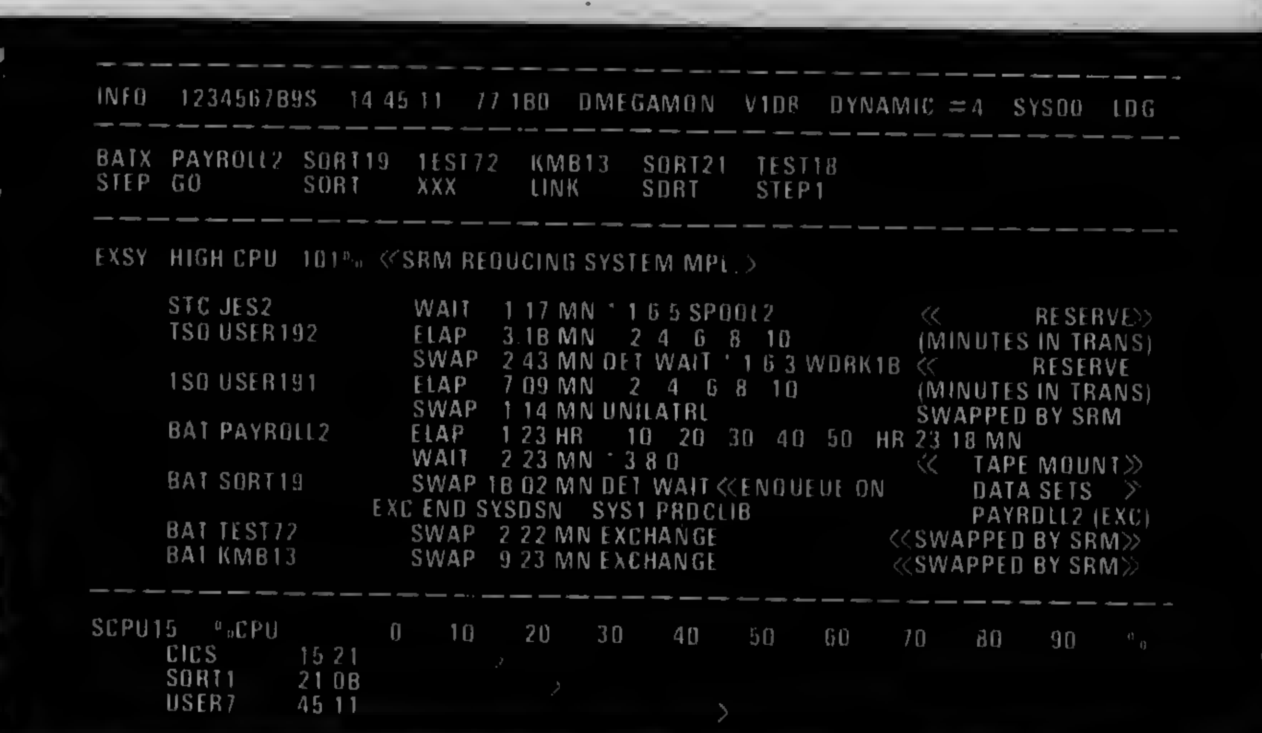
OMEGAMON illumination
Real time exception analysis for MVS

OMEGAMON: a state of the art software display monitor for MVS operators and systems programmers.

OMEGAMON using a dedicated 3270 in an MVS operating environment.



```
INFO  123456789S  14 45 11  77 180  OMEGAMON  V1D8  DYNAMIC =4  SYS00  LDG

BATX  PAYROLL2  SORT19  TEST72  KMB13  SORT21  TEST18
STEP  GO        SORT    XXX     LINK   SORT    STEP1

EXSY  HIGH CPU  101%  <<SRM REDUCING SYSTEM MPL >

      STC JES2           WAIT  1 17 MN ' 1 6 5 SPOOL2         <<         RESERVE>>
      TSO USER192        ELAP  3 18 MN   2  4  6  8  10       (MINUTES IN TRANS)
                         SWAP  2 43 MN DET WAIT ' 1 6 3 WORK18 <<       RESERVE
      TSO USER191        ELAP  7 09 MN   2  4  6  8  10       (MINUTES IN TRANS)
                         SWAP  1 14 MN UNILATRL               SWAPPED BY SRM
      BAT PAYROLL2       ELAP  1 23 HR   10  20  30  40  50  HR 23 18 MN
                         WAIT  2 23 MN ' 3 8 0                <<  TAPE MOUNT>>
      BAT SORT19         SWAP 18 02 MN DET WAIT <<ENQUEUE ON      DATA SETS  >
                    EXC END SYSDSN   SYS1 PROCLIB                 PAYROLL2 (EXC)
      BAT TEST72         SWAP  2 22 MN EXCHANGE             <<SWAPPED BY SRM>>
      BAT KMB13          SWAP  9 23 MN EXCHANGE             <<SWAPPED BY SRM>>

SCPU15   %CPU        0    10    20    30    40    50    60    70    80    90    %
      CICS      15 21        >
      SORT1     21 08            >
      USER7     45 11                       >
```

OMEGAMON displaying exception information and tasks with high cpu utilization.

Carol Powall joins
Candle Corporation as
Vice-President of the
Computer Services Division.

How many of these problems do you have?

Tape Mounts?

```
BAT PAYROLL2        WAIT 2 23 MN     ' 3 8 0          <<TAPE MOUNT>>
```

Batch job PAYROLL2 waiting 2 minutes 23 seconds on a tape mount.

Enqueue Waits?

```
BAT SORT19          SWAP 18 02 MN DET WAIT  <<ENQUEUE ON   DATA SETS>>
                    EXC END  SYSDSN SYS1 PROCLIB              PAYROLL (EXC)
```

Batch job SORT19 swapped out (detected wait) for 18 minutes 2 seconds due to enqueue on data set SYS1.PROCLIB currently held by job PAYROLL.

Dasd Dropped Ready?

```
+ + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +
+
+  DANGER DASD DROPPED READY AT ADDRESS 162        VOLUME MVSRES    +
+  CURRENT USER  JES2                                               +
+  DEPTH OF I/O QUEUE  4                                            +
+ + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +
```

Dropped ready exception indicates address, volume, user and number of I/O's waiting on device.

Initiators Tied Up?

```
BAT    PAYROLL    ELAP  1 23 HR     10   20> 30   40   50   HR 23 18 MN
BAT    SORT21     ELAP 45 17 MN     10   20   30> 40   50.  HR 35 17 MN
BAT    TEST18     ELAP 12 03 MN  >  10   20   30   40   50   HR   2 03 MN
```

Elapsed time exception analysis for batch jobs. Thresholds are assigned on a job class basis (1 hr for PAYROLL, 10 min. for SORT21 and TEST18). Elapsed time is on left, "over-time" on right, and plot of over-time in between.

TSO Response Time?

```
TSO    USER192    ELAP 3 18 MN   2 >4   6   8   10 (MINUTES IN TRANS)
TSO    USER191    ELAP 7 09 MN   2   4   5 >8   10 (MINUTES IN TRANS)
```

TSO response time exception analysis. Time thresholds are assigned on a transaction "period" basis.

```
PGRP02
PRD #01  #TRANS    298 SWAP/TRANS  1 0 RESPONSE (SEC)    4
PRD #02  #TRANS    175 SWAP/TRANS  1 6 RESPONSE (SEC)  2 1 # #
PRD #03  #TRANS     64 SWAP/TRANS  1 7 RESPONSE (SEC)  7 3 # # # # # #
PRD #04  #TRANS     18 SWAP/TRANS  1 7 RESPONSE (SEC) 12 8 # # # # # # #
```

TSO response time information by period number (ie. by complexity of transaction.)

Reserve Lock-outs (Multi-system environment)?

```
STC JES2           WAIT  1 17 MN ' 1 6 5 SPOOL2         RESERVE
TSO USER192        SWAP 2 43 MN  ' 1 6 3 WORK18         RESERVE
```

In a multi-system environment with shared dasd, RESERVE lock-out detection can be crucial. When running V=R and EXCP to a 3270, OMEGAMON requires no I/O to dasd devices or control units and is not affected by console lockouts (WTO/WTOR).

SRM Swaps?

```
EXSY    HIGH CPU   101%    <<SRM REDUCING SYSTEM MPL>>
        TSO USER191         SWAP 1 14 MN UNILATRL           <<SWAPPED BY SRM>>
        BAT TEST72          SWAP 2 22 MN EXCHANGE           <<SWAPPED BY SRM>>
        BAT KMB13           SWAP 9 23 MN EXCHANGE           <<SWAPPED BY SRM>>

SCPU10    %CPU    0    10    20    30    40    50    60    70    80    90    %
        TCAM   11 18        >
        CICS   15 21          >
        SORT1  21 08             >
        USER7  45 11                         >
        TEST2  13 27         >
```

The high cpu utilization causes the system resources manager to reduce the number of active tasks (MPL) in the system. As a result we see a TSO user having to wait for 1 minute while 2 batch initiators are frozen for a total of 11 minutes. The SCPU10 command selects any task using more than 10% of the cpu. (Note TSO user USER7 had 45.11% cpu utilization which indirectly caused the batch jobs to be swapped out)

Storage Exceptions?

```
TSO     USER22      EXCESSIVE WORKING SET SIZE =  300K
                    EXCESSIVE NON VIO SLOTS     = 1300K
BAT     SORT21      EXCESSIVE FIXED FRAMES      =  180
BAT     PAYROLL2    EXCESSIVE SWAP COUNT        =   51
```

OMEGAMON exception analysis for real and virtual storage and swapping.

SOME OF THE PROBLEMS DISCOVERED BY OMEGAMON

SYSTEM LOCKED OUT!
- —JES2 waiting on SPOOL control unit
- —MVSRES had pseudo reserve (34 I/O's)
- —PLPA waiting on I/O
- —MSS – virtual disk

Severe System Degradation
- —MVS under VM:SRM problem
- —Spool pack full
- —SMF Buffers (batch)
- —high paging:TSO Edit used VIO
- —dasd dropped ready (Scratch pack)

Moderate System Degradation
- —2 page data sets on same 3330
- —Insufficient TCAM buffers
- —local page data set:inoperative
- —shared dasd logic on single system
- —main storage shortage due to SOA contamination from a CICS test system

ONLINE SYSTEMS
- —CICS in a loop
- —TCAM in error recovery
- —CICS:dasd competition from batch
- —Tape control unit lock out

TSO Problems
- —contention on TSO storage pack
- —tape swaps (DDR)
- —waits on usercatalogs
- —inter system reserves
- —TSO loop
- —waiting on SMF buffers
- —SRM swaps

Batch Problems
- —tape mounts
- —data set waits
- —Batch job in loop
- —SRM swaps

OMEGAMON USERS (partial list)

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Two for Price of One

Pottawattamie Finds Dual Minis Pay Off

By Ann Dooley
CW Staff

COUNCIL BLUFFS, Iowa — Pottawattamie County pulled its payroll off a service bureau and its accounting applications off an outdated accounting machine and put them on two minicomputers to save time and improve work flow.

The county DP center here decided to purchase the Olivetti A5 minicomputers more than a year ago and the county auditor, Douglas Primmer, feels it's the best choice that could have been made. "Expense-wise, it's the best — we have two machines for the price of one," he explained.

Primmer looked at Burroughs and NCR equipment as well as the A5, but decided that for the county's needs the simpler system seemed the best, he said.

The county's problem wasn't really speed but workflow, he recalled. "We were working with slow turnaround time and an antiquated system," he said.

In addition, the payroll for the more than 400 county employees was done by an outside vendor and the turnaround time was not good, according to Primmer.

When an error occurred on a payroll check, it could not be corrected until the next paycheck was issued. Now an error can be corrected immediately.

Now, one minicomputer performs payroll and checkwriting applications and the other handles the accounting functions. In addition, one A5 is used for program development; the other runs the applications.

Backup in a Pinch

In case of a pinch, Primmer said, both could be used for one function; if one went down, the other could be used as a backup. The systems also perform all the bookkeeping and produce reports for the county, which has a population of 90,000.

In addition to providing faster turnaround time, the systems are easier to use and the number of operator errors have therefore been reduced, Primmer said.

Olivetti has provided good service and maintenance since the sale, he said, adding the vendor maintains all the county's data on cards which can be used on Olivetti's own system, if necessary.

The county's A5 systems might be expanded if the work keeps increasing and it proves necessary, Primmer commented.

Pottawattamie's present systems are valued at about $16,850 including programming and maintenance. The basic components of each system include a microprocessor, random-access memory, keyboard, printer, magnetic card unit, communications logic and logic to accommodate optional peripheral devices.

Higher Expectations of Users Seen Buoying Distributed Trend

By Esther Surden
CW Staff

SEATTLE —Small is beautiful, a panel of vendors and consultants agreed here recently during a session on minicomputers at the Association for Computing Machinery conference.

Minicomputers are becoming more complex, and at the same time people have higher expectations for their systems, according to David Nelson, director of research for Prime Computer, Inc. The trend toward both interactive and distributed mini systems will continue, he predicted.

Nelson identified several hardware trends. Among them: minis will begin to use larger virtual address space, and more sophisticated data management systems will become available.

In the software area, better command and query-type languages will be developed.

Hardware features that will appear include greater use of cache memory and file systems distributed across networks.

Some communications advances also can be predicted, he said, and vendors of minicomputers will begin supplying packaged networks in the future. Considerable advances will take place in local networking with the increased use of very fast coaxial cable and fiber optic methods.

Slow Software Development

Ned Chang, senior vice-president for marketing at Wang Laboratories, Inc. said advances in hardware have far outstripped advances in software.

Software development moves very slowly in comparison to the swift advances that have been made in such areas as chips, bubble memories and disk capacity, he said. Prices of memory and even of printers have come down, while software remains very expensive, he indicated.

Although adequate progress has been made in the development of "languages for use by the computer professional," at the end-user level the only advances have been the direct results of transaction processing,

(Continued on Page 41)

Mini Bits

Series/1 Joins Common

BOSTON — Users of IBM Series/1 minicomputers at a recent meeting here formally petitioned Common, the IBM small systems user group, to establish a permanent project within that organization.

The Series/1 users will join IBM System/3, 1130, 1800 and DOS users, which each have special categories.

HP Hikes Education Prices

SANTA CLARA, Calif. — Membership and newsletter subscription fees for the Hewlett-Packard Educational Users Group will be increased effective today.

For people in organizations that use HP computers, the combined membership and subscription fee will be $8 a year. In the past it was free.

However, a designated site representative and four other people in user organization will receive all user group communications, services and the newsletter free of charge, the firm noted. Back issues of the newsletter can be obtained for $1.25 per issue.

The newsletter subscription fee for people in organizations without HP computers will be $20 year, up from $6. Back issues for this group will be priced at $2.50 per issue, HP said from 5303 Stevens Creek Blvd., Santa Clara, Calif. 95050.

Charles River Enhances Floppy

WALTHAM, Mass. — Charles River Data Systems has enhanced its MF-11 floppy disk system with an additional "quad backplane."

The MF-11 using the quad backplane can accommodate several interface cards for any of the various peripherals used with Digital Equipment Corp's LSI-11, Charles River claimed.

The unit is reportedly "functionally identical" to the DEC PDP-11/V03, a spokesman noted. It houses a Shugart dual floppy disk system, front panel console and power supply.

A basic system with the option costs $4,790. The company is located at 235 Bear Hill Road, Waltham, Mass. 02154.

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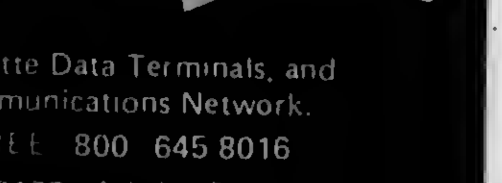

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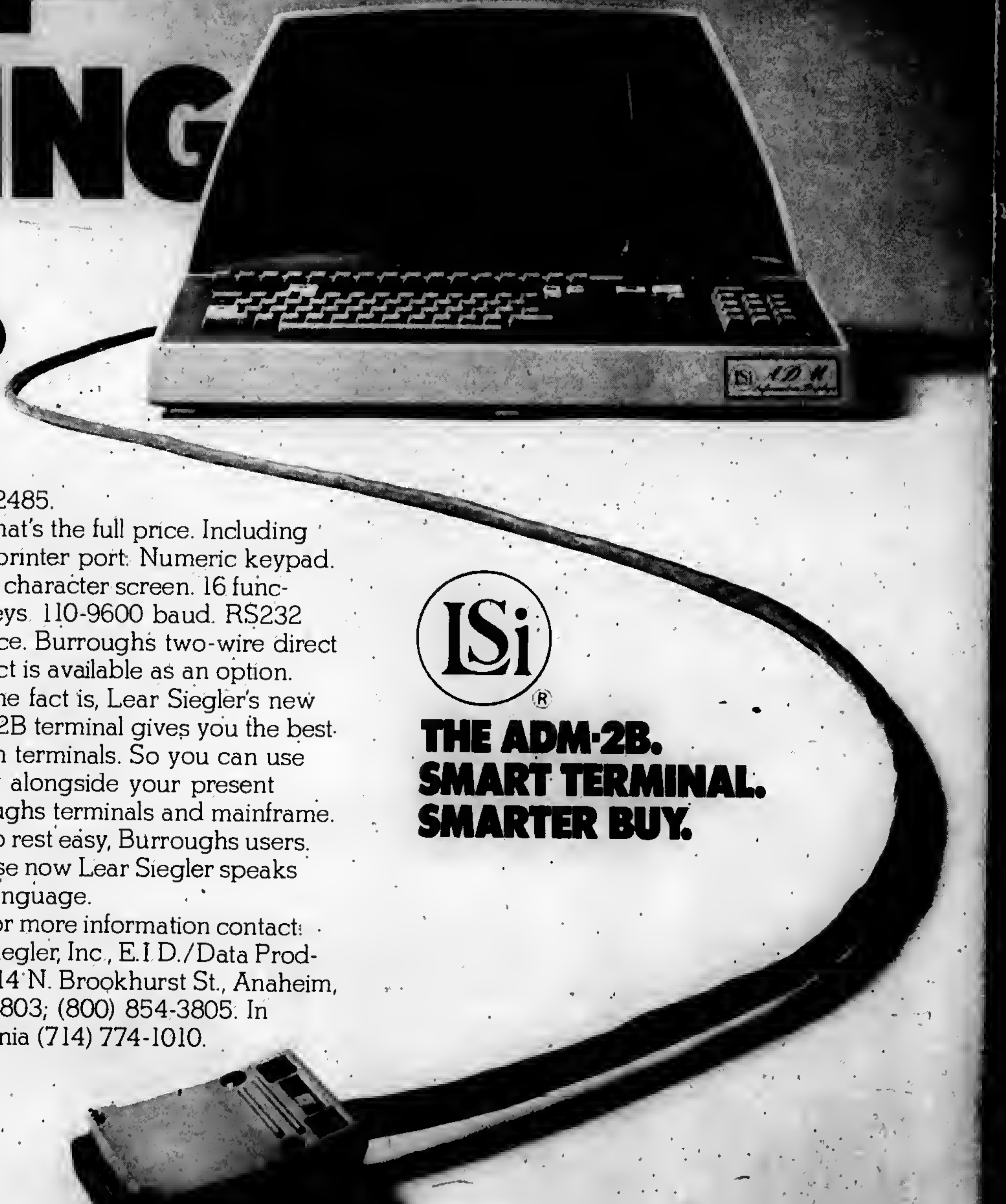

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The fact is, Lear Siegler's new ADM-2B terminal gives you the best of both terminals. So you can use it right alongside your present Burroughs terminals and mainframe.

So rest easy, Burroughs users. Because now Lear Siegler speaks your language.

For more information contact: Lear Siegler, Inc., E.I.D./Data Products, 714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

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DG Adds Fixed-Head Drives for Nova, Eclipse

WESTBORO, Mass. — Data General Corp. has introduced two fixed-head "Winchester" disk drives for its Nova and Eclipse subsystems.

The subsystems transfer data at 910,000 byte/sec; the average access time is 10.12 msec, DG said.

The drives are available in 1M- and 2M-byte capacities. Both are 8.75-in. high, rack-mounted units.

Maximum subsystem capacity is four drives per subsystem in any combination of the two sizes, the firm said.

The subsystems are supported by the DG Advanced Operating System (AOS) and Real-Time Disk Operating System (RDOS). They were designed for instrumentation users who need to store data collected at very high rates, for commercial users in applications requiring high transaction rates for keyed data access and for time-sharing users as swapping devices.

The subsystem receives commands via the data channel instead of programmed I/O control, DG explained. Multiple data sectors can therefore be read using a queueing technique in the controller, eliminating interrupts and central processor intervention between sector data transfers.

This "data chaining" is supported in RDOS and AOS, while controller hardware also permits user-written channel program "command chaining," a spokesman noted.

A second major controller feature is error correction, he said. When writing data, the controller calculates a 32-bit error-checking code reminder which is written on the disk as a postamble to the data.

When reading, the controller recalculates checkwords and checks in hardware for error indications. This technique permits error detection in hardware and software correction of all single-burst errors up to 11 bits long in a 512K-byte sector, DG claimed.

A 1M-byte subsystem costs $9,900 while a 2M-byte subsystem is priced at $13,900, DG said from Rte. 9, Westboro, Mass. 01581.

User Expectations Rising

(Continued from Page 39)

he stated.

"Forgiving" user-oriented software must be developed, Chang stated. The development of such software will help place computers not only on every person's desk but also at home for entertainment, he predicted.

With another point of view, Kithie Gately, software director for Administrative Systems, Inc., said the hobbyist computers can also be used for small business applications. "The hobbyist micro is indeed a very powerful tool" that can support sophisticated languages and powerful operating systems, she told the group.

Warnings About Turnkeys

A turnkey minicomputer vendor, Robert Sheer, president of Boston's Sheer Development, warned users to beware of vendors who are really just "relieving the small business people of their assets." Although there are several reliable firms, a lot of turnkey systems houses take total responsibility for hardware and software when they do not have the staff to do so nor the qualifications to fix the systems.

To a small business person, a minicomputer promises the relief from clerical chores that the large companies have seemingly achieved. But in actuality, the large companies are trying to escape from the control of a large central DP department that did not live up to that promise. This is what is becoming known as distributed processing, he added.

Finally, a consultant to first-time users gave the attendees a hint on how to select a minicomputer. According to Gordon Stokes, professor of computer services at Brigham Young University, and a consultant, the most important aspect of selecting a small system is to make sure the system will accommodate the applications you will want to perform in the future.

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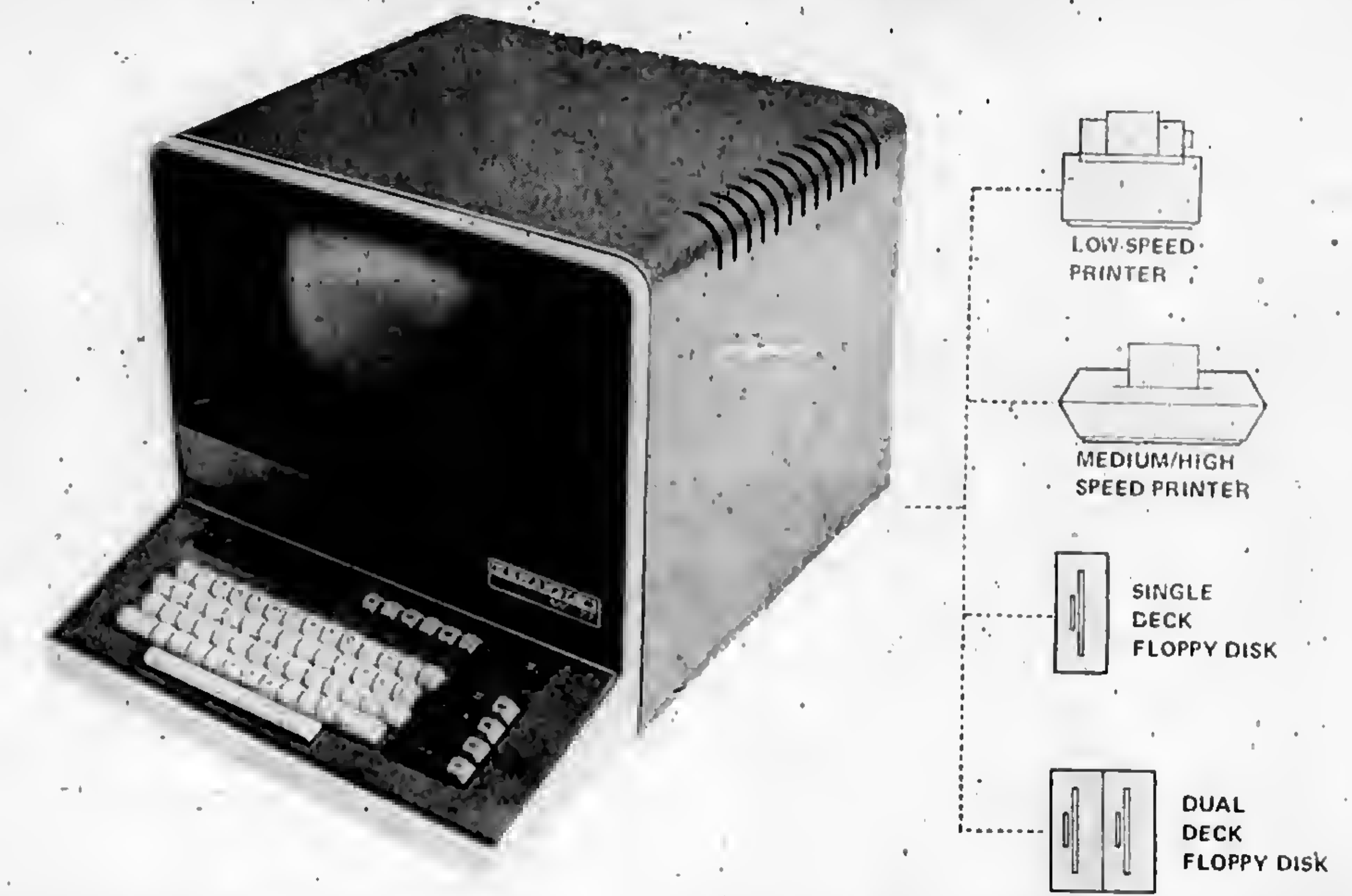

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Microdata Adds System

IRVINE, Calif. — Microdata Corp. has announced a business computer system dubbed Royale with what is said to be "a totally new architecture" compared with its existing product line.

The features of Royale's computer architecture include an I/O processor (IOP), expanded core memory and increased firmware, the firm said, and the Royale is upward compatible with the firm's existing Reality system.

400% More Firmware

According to Ted Ellison, Royale family project manager, firmware in the Royale CPU has been increased 400%. Two-thirds of the new firmware is devoted to the operating system with the remainder allocated to improved diagnostics, he said.

Languages used with Royale are "English, Microdata's retrieval language for data access and report generation: Data/Basic (with firmware implementation); Proc, a procedural control language; RPG II; and Runoff, a word processor language designed to work without file structure.

The basic system consists of 16K bytes of main memory, one 10M-byte disk, one 37.5 in./sec "Lode Star" cartridge tape unit, one CRT terminal and one 120 char./sec printer and costs $35,995.

Deliveries will begin in December.

Microdata is located at 17481 Red Hill Ave., Irvine, Calif. 92714.

UL-Approved Media Safe Holds Small User's Records

LAFAYETTE, Ind. — Schwab Safe Co. has designed a media safe, called the Fireguard, to handle the record storage requirements of the typical small systems user.

Certified by Underwriters Laboratory (UL), the safe requires 6.75 sq ft of floor space. It will accommodate 50 tapes in seals, 540 diskettes in trays or three 3348 data modules on roll-out shelves, Schwab said.

Optional interior components are available to customize the safe's interior to the user's specific application, a spokesman noted.

The safe is equipped with a "Group 2" key change combination lock and an approved relocking device to set the bolts if the lock is punched in a burglary attempt, he said.

Optional X-ray proof locks or key-locking combination dials provide security against theft or espionage, the firm added.

Without interior cabinetry, the safe costs $1,395. Interiors vary according to each users needs, the spokesman explained from 3000 Main St., Lafayette, Ind. 47902.

TI Calculator Works as Basis Of Business Unit

LUBBOCK, Texas — Texas Instruments, Inc. has introduced the SR 60A, a computer/calculator that reportedly works as the basis of a business system.

The SR 60A uses a microprocessor to control an optional letter-quality typewriter with full I/O capability for full-page reports and multiple-copy forms printouts, TI said.

The microprocessor can also control up to two digital-quality cassette tape drives with file management capability for on-line storage and retrieval of payroll records, inventory status and sales orders, a spokesman noted.

The SR 60A can handle inventory, payroll, general ledger, accounts receivable, income tax, cost estimating and pensions.

The basic machine, which weighs 16 lbs, provides up to 2,640 program steps or 330 data registers, expandable to 7,920 program steps or 990 data registers with optional memory modules, TI said.

The SR-60A costs about $1,995. TI can be reached through P.O. Box 53, Lubbock, Texas 79408.

PAI Puts Z80 At System Heart

LEE'S SUMMIT, MO. — Profit Assurance, Inc. (PAI) has a business system based on the Z80 microprocessor unit.

The Model Z1001 system configuration includes up to 64K bytes of memory; two dual-density floppy disk units; a 132-column, 300 line/min printer and a 1,920-char. CRT.

With the firm's FDAM operating system and Z80 macro assembler, the system costs $13,325.

The unit is expandable with magnetic tape units, multiple CRTs and 70M-byte disk units, PAI said from 818 Parklane, Lee's Summit, Mo. 64063.

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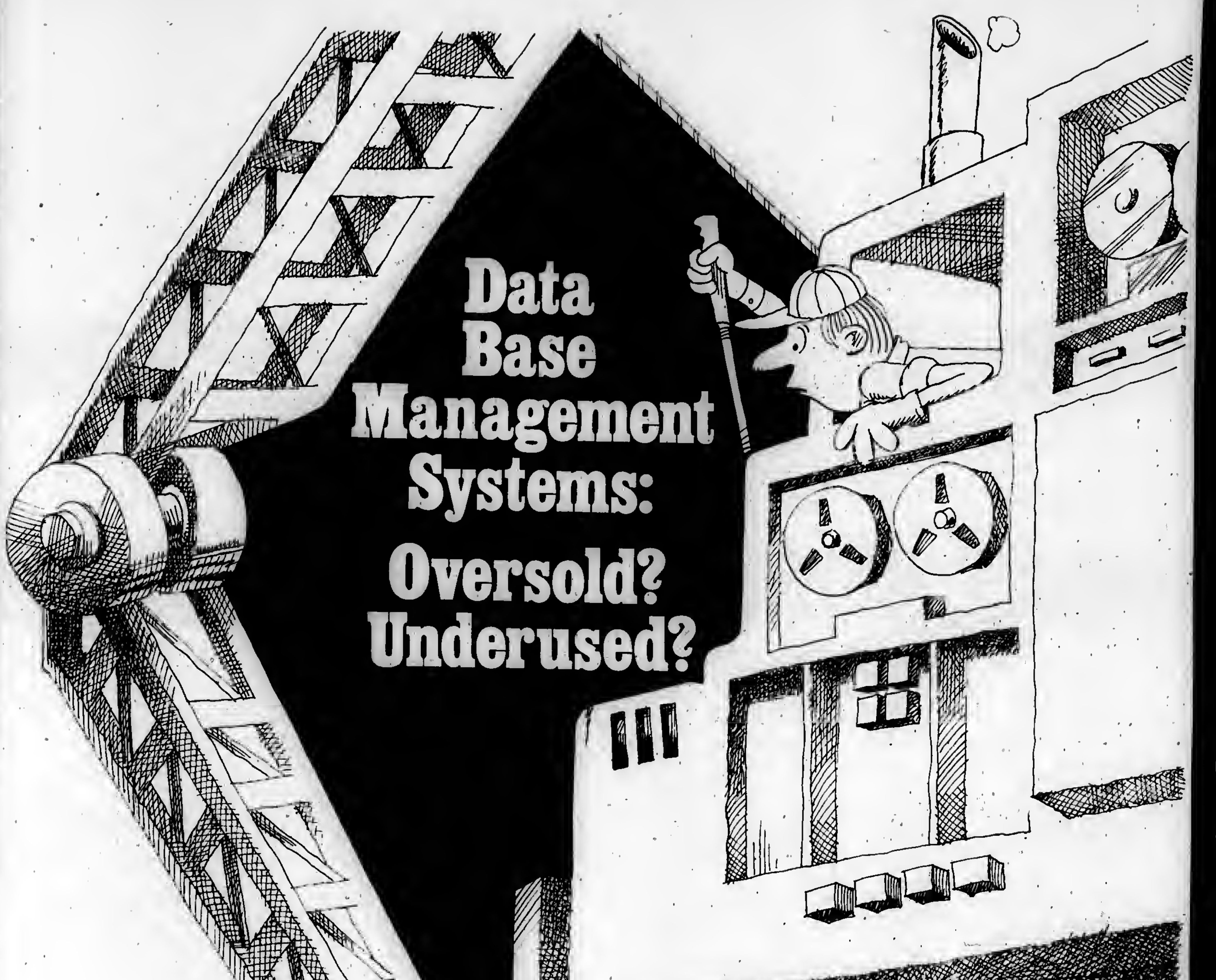

A COMPUTERWORLD SPECIAL REPORT

October 31, 1977

Edited by Don Leavitt

Growing Body of Users Stakes Hopes in DBMS

By Don Leavitt
CW Staff

Data base management systems have been part of the data processing scene for the past decade and users have been turning to them in growing numbers — and growing hopes — since the early 1970s.

The systems gained a reputation, probably deserved, as the way of the future — the way to overcome the frustrations and weaknesses of the conventional file-oriented ways of data processing. They seemed to coincide with the awareness that information management is more than data processing.

The benefits of the data base systems have been stated many times in the literature and in the ads of the growing number of vendors. In perhaps simplistic terms, they focus on three particular concepts:

- Data independence: Application programmers working with the DBMS no longer need to be concerned with where or how their data is stored, or if the data base itself is modified or extended.
- Reduction of data redundancy: A central depository of data generally means there is a need to maintain only one copy of any particular element. This hopefully leads to easier maintenance and more assurance that all applications working with the element have current and consistent value for the element.
- Making data available for other uses: "A growing base of data for a growing ease of users" has long been a phrase that held the greatest hope for the installations that installed these new-fangled systems.

Those benefits had to become realities if the installations and their managers were to cost-justify their acquisition of the data base systems. They cost substantial amounts of time, money and effort to get up and running. The overhead they impose on the whole DP operation is also substantial and has to be offset by real gains.

But what often happens — and you can sense it in some of the stories in this special report — is that the implementing organization gets overwhelmed with the effort expended on the first application. They may in fact have cost-justified all their expenditure with that application. But they tend to hold back on the followup exercises that would add to the credit side of their data base ledgers with much less of an impact on the debit side.

The tone of this report is generally optimistic. All the stories were volunteered and most of the authors are positive in their opinions — with one or two articulate exceptions — about DBMS, but, as in other special reports earlier this year, the stories are particularly useful because they concentrate on the work needed to get the systems in place rather than on the "glorious new life" they will provide.

It seems clear most of the authors would appreciate comments on their thoughts and their experiences. Letters or articles stimulated by this report would be welcomed by CW.

Data Base Provides Business Model

By Frank A. Dottore
Special to CW

The distinction between application systems and data base systems becomes more evident as a person gains experience with both.

An application system is an information model designed to produce specific output and which requires specific input. An information model is constructed to serve current information needs and to bring order to informational chaos by regulating flow and content.

The information model, used as an aid in business decision making, has been found to have many shortcomings which usually involve high costs, low efficiency and lack of flexibility. These problems have begun to draw management's attention toward data base concepts.

Data bases do not store information as information. They store data that can be used to generate information. They are, in effect, data models of a business. Data base systems, unlike application systems, either provide data to the computer or take it out, not both.

Data base development generally follows a path different from application development. Rather than automating function by function, data base development concentrates first on identifying what data should be stored in the computer. This base data is used to run the company. The cost and efficiency questions, which eventually lead to storage of parts of this data in a computer, can only be answered in terms of the cost and efficiency of doing business.

Control Functions

Data base development is performed in a data base management system (DBMS) organized around three basic control functions: a data base input control function, a data base output control function and a data base storage and processing control function. These three DBMS functions provide a new set of ground rules for automation, and the ground rules require that the concept of individual computer applications, each with its own input, storage and output, be abandoned.

Data base management systems, which collect and manage input to a data base, have as their primary purpose the maintenance of data quality and integrity. They are not concerned with the ultimate use of the data. They are constructed to capture data at its source, regardless of whether that source will ever see the data in the form of output. They provide input techniques, edits, audits, security and diagnostic controls intended to optimize data quality, integrity and cost.

The data base input control system, once established, undergoes few changes because it is not directly related to the company organization structure or individual management policy. If it is properly constructed, it will be affected only by the requirements for more or less data of higher or lower quality, or by changes in technology that would make data input more efficient or economical.

The data base output control function operates differently from the input function, as it is related to both company organization structure and specific management policy or directives. Data base systems that receive and use output are the most dynamic systems in the company because they answer questions developed for management decision-making needs.

Changes in these needs can be affected by almost anything, including personalities, management styles, economics, politics, changes in func-

(Continued on Page S/12)

Multiple DBMS Operate With Little File Redundancy

By Don Caskey
Special to CW

ATLANTA — A Catholic college preparatory school here has implemented three separate data base management systems (DBMS) on its Hewlett-Packard mini to greatly expand services to its faculty, alumni and students.

Ease of operation and low acquisition cost were major considerations in Marist's decision to go with separate DBMS software for each application. Data currently stored on-line includes alumni records (2M bytes), college selection information (3M bytes) and extensive demographic and academic records on the school's 800 seventh- through 12th- grade students (7M bytes).

A fourth data bank is slated to be operational this winter to service financial accounting applications and it will utilize still another DBMS. Even so, the school estimated data file redundancy is less than 10%, and software acquisitions are considered to be extremely low by market standards.

This fits the schools DP objectives and resources for several reasons.

First, disk space, though carefully supervised, is not a critical operational factor. The 77-year old school acquired its slightly used HP 2000F time-sharing system three years ago. It has 32 time-sharing ports, a 32K-word CPU and an 8K-word IOP.

In the deal the school also received a 23.5M-byte disk drive. This is an "overconfiguration" by many educational users' standards, but it permitted development and acquisition of DBMS software without the pinch for space that forces many users into costly and time-consuming coding, packing and unifying software development projects.

Even with the added financial package, the school plans to continue to provide space for student programs, computer-aided instruction (CAI) and drill practice lessons, a several-hundred-program public library, departmental inventory files and space for off-campus users (which this year included three colleges, three high schools and a guidance center).

Since the school has only one professional DP staff member (and even he has other administrative duties), a high priority for a DBMS was minimization of software development and user training time.

Little Training Needed

HP gave Marist its alumni DBMS with the system, and although the software (called Findit) was written to handle a number of different applications, the examples used throughout

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Data Dictionary	Vendor	DBMS
Cincom Data Dictionary	Cincom Systems	Totel
Control-2000	MRI Systems Corp.	System 2000
Data Base Directory	Eastern Air Lines, Inc.	Total
Data Catalogue	Synergetics Corp.	IMS, Totel, Adebes
Detamanagar	Management Systems and Programming	IMS, Totel, Adebes, IDMS
DB/DC Data Dictionary	IBM	IMS
Integrated Data Dictionary (IDD)	Cullinane Corp.	IDMS
Lexicon	Arthur Andersen & Co.	IMS
UCC TEN	University Computing Co.	IMS

Listed above are the most prominent data dictionary packages currently on the market. The offerings of four DBMS vendors are evident; the remaining packages are offered by independent sources. Several mainframe vendors besides IBM also offer data dictionary capabilities in conjunction with their DBMS.

'Data Dictionary System' Needs Its Own Definition

By Ronald G. Ross
Special to CW

Over the past several years, data base administrators (DBAs) have begun to identify a number of areas in which the creation and management of data bases can be facilitated. Although there are probably as many opinions on the subject as there are DBAs, much of the discussion centers on what is rightly called the data dictionary problem.

Three functional areas are likely to be addressed by a data dictionary system. The first of these has to do with the design of data base systems; a data dictionary that assists in this area may be called a design aid.

In this interpretation of the data dictionary problem, the data dictionary serves as a repository of information collected during the analysis that leads to the creation of the data base. Such information typically includes the definition of data elements, estimates of usage frequencies, delineation of security requirements and so forth.

Subsequent to implementation of the data base, this information serves both as documentation for the system and as a base line for monitoring changes in usage patterns and data requirements. If these changes are extensive, then the data dictionary may serve as a redesign aid.

A second functional area is in the actual implementation of data base systems. A data dictionary can provide a number of services, which collectively improve the productivity of data base administration and programming. Such services might typically include data base description, subschema generation, data description for application programs and similar functions.

Significantly, these services are supported not only during the implementation of a data base system, but subsequently as well. In this manner, the data dictionary becomes a tool in facilitating what is generally called system maintenance. (This is reminiscent of data base goals.) We can call this type of data dictionary capability administrative aids.

The last functional area is "in-line" operational aids. In this interpretation, the data dictionary becomes part of an executing data base manager and contains information that assists in scheduling jobs, verifying security, validating transactions, etc.

At the same time, statistics may be gathered on actual data base usage. Information of this type can be used to determine the need for reorganization, for redesign of the data base or even for reeducation of users.

These three functional areas are likely to be represented to varying degrees in any given data dictionary system. We have by no means covered all the possibilities: for example, some feel the data dictionary should intercede in the behalf of the end user to translate information requests into the

(Continued on Page S/10)

Further Readings

The following are some of the more significant publications that have appeared in recent years on the subject of DBMS. Also listed are some Association of Computing Machinery (ACM) periodicals devoted to that topic. Most of these items have extensive bibliographies which can lead the interested reader into the journal literature.

ACM, **Data Base Management Systems, Comp. Surveys**, 8 (No. 1), March 1976 (Special issue on DBMS)

ACM, **Transactions on Data Base Systems**

ACM, **Data Base — A Quarterly Newsletter of the Special Interest Group on Business Data Processing (SIGBDP)**

ACM, **Proceedings of Workshops of Special Interest Group on File Description and Translation (SIGFIDET) (Now SIG Management of Data-SIGMOD)**

J.L. Berg, (Ed.), **Data Base Directions: The Next Steps:** The National Bureau of Standards (NBS SP-451), 1976

Codasyl Systems Committee, **Selection and Acquisition of Data Base Management Systems**, ACM (1133 Ave. of the Americas, New York, N.Y. 10036), 1976

Codasyl Systems Committee, **Feature Analysis of Generalized Data Base Management Systems**, ACM, 1971

C.J. Date, **An Introduction to Database Systems** (2nd Ed.), Addison-Wesley, 1977

B.C.M. Douque and G.M. Nijssen

(Continued on Page S/10)

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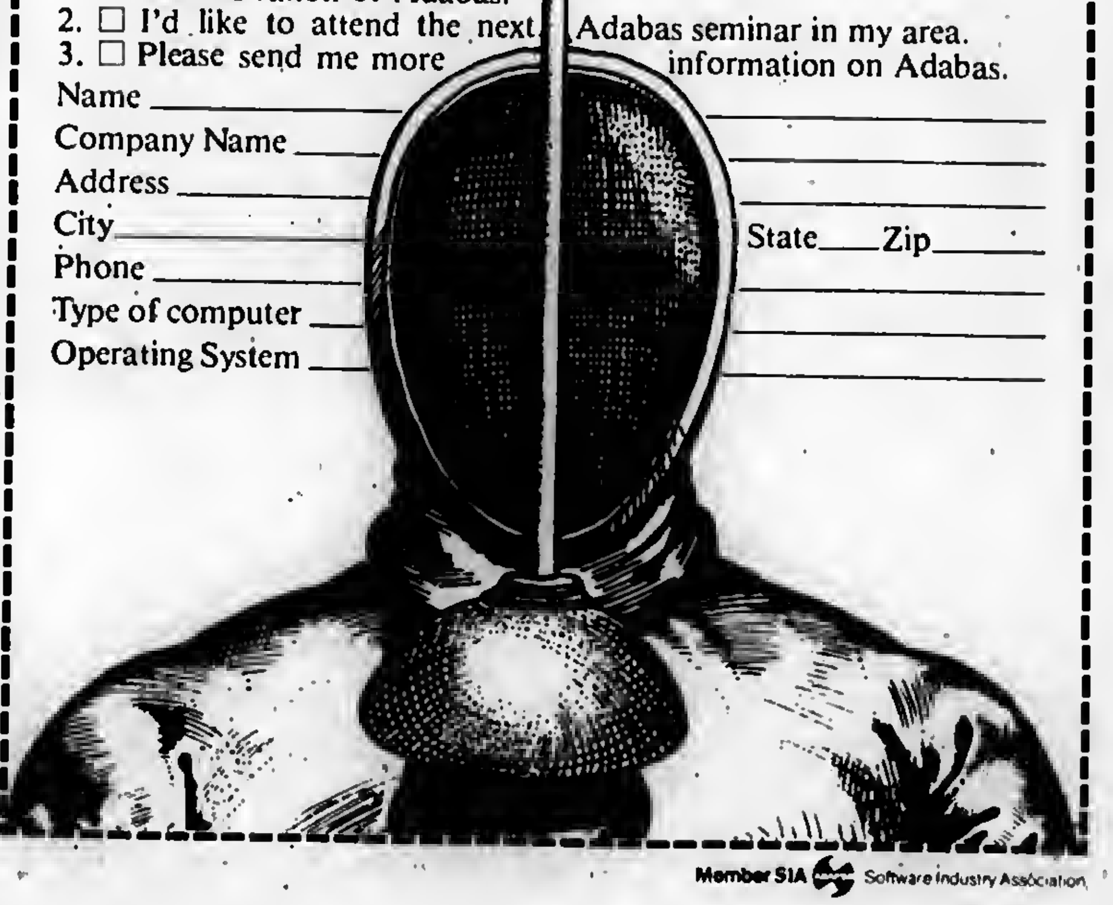

Beware 'Cure-All' Pitch From DBMS Vendors

By Patrick J. Cox
Special to CW

"You need a data base management system (DBMS) package now! Your traditional file organizations are outmoded. We'll give you integrated data, nonredundant data, data independence, infallible data security, custom views of data, perfect backup and restart and then we'll link everything together in a miraculous way that will enable upper management to snap their fingers and make fantastic ad hoc reports appear in minutes. All this plus it maintains itself! That's why we call our DBMS package Magic. Yes, Magic, Monolithic Aggregation of Gigantic Information Capability. Don't wait! Order now! We'll plug in Magic today and you can fire your entire data staff tomorrow."

This portrait of a software huckster is deliberately unfair. In the last few months, however, I felt like the object of such oratory.

I've looked at several DBMSs. I'm now convinced that DBMS is not magic or revolutionary and some people need it and others don't.

Everything Has a Price

To avail ourselves of all the things some vendors promise we must be willing (possibly) to increase on-line storage, process slower, employ a Data Base Administrator, (DBA) and do a lot of solid front-end research into our current and future information needs. Also we must be ready to spend between $25,000 and $75,000 for the DBMS and its options (available at proportionate rental rates).

Opinions on the requirement for a DBA run the gamut from none needed to the other extreme, a 25-hour-a-day superman with all encompassing technical and business expertise who is empowered to single-handedly run the company. The good data base requires a competent overseer and the superman cape is impossible to fill, so realistically you use a senior systems analyst. With a sophisticated information system the DBA position will be a full-time one, You've just added $20,000 plus a year to your data base budget.

Congratulations if you meet your schedule. It's possible, especially if the front-end work was ready before the purchase or lease of the DBMS. As often as not, however, the front end is not completed. It seems to be all there in the file layouts, print formats, etc. But then the first "Abracadabra" field surfaces.

What is this field? What does it do? It must have a function, the existing system runs with it. No one seems to know. You read program listings and there, finally, is a reference to it. Personnel uses it as an anniversary date for employees of XYZ company that merged with us 14 years ago. Unfortunately, it's used under another condition with a totally different meaning elsewhere in the system.

Several "Abracadabra" fields appear as we're building our data base. We'd better get together with all levels of management and clarify these multiple meaning data fields. This might take awhile; we'd better let everyone know that the project will be a little late.

Let's take another tack though. We'll assume we've really got a handle on what is in our old data files and what each element is used for. All we have to do is interrelate data elements. At the same time we'll eliminate all data redundancy. Let's just tie things together in the data base with paths similar to the old ones, but of course more efficiently because they're maintained by the DBMS.

But wait. We're supposed to open up endless reporting avenues to the company. Better get together with management and find out what the company really wants and what the priorities are. This might take awhile.

Finally we've got data elements that are clearly defined, data paths that form every conceivable information requirement, absolute nonredundancy of data and all of this combined with the DBMS supervised data independence. The DBA can give the programmer the elements and paths he wants him to have. To the programmer it will appear all elements are independent. But the DBMS must

(Continued on Page S/16)

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Via On-Line Retrieval

Network Users Access Predefined Data Bases

By Tom Gregory
Special to CW

Information on every subject new and old is piling up worldwide at an ever increasing rate. The time consumed and the money spent in the traditional library search for specific information can become the single biggest element in any endeavor. Out of date, out on loan, lost or incomplete references and the realization that the information needed for review is in a library 100 miles away can completely frustrate most research.

Contrast that with sitting in front of a terminal connected to an ordinary telephone in the comfort of your home or office and being able to search through millions of individual references, review the most promising, redirect a search based on something just uncovered and find the specific information required in just a matter of minutes. This is the world of on-line information retrieval utilizing commercially available data base systems.

An on-line data base system is a vast and continuously updated file of information that can be remotely accessed by ordinary low-speed CRT or teletypewriter terminals over common phone lines. Individual data bases can contain many millions of references or items of data. There are two general types of on-line data base systems, numerical and bibliographical.

Numerical data base systems consist of files of numerical data coupled with a software system that allows for the search, isolation, retrieval, display and further manipulation of the retrieved data by means of some computational routine.

Bibliographical data bases contain references or summaries of articles, books, completed or current research, dissertations, papers and other kinds of information on a particular subject or subjects. They are designed so that by using a subject heading, a key word, a key phrase or an author, one can search for, sort, review and then print any part of a citation contained in the data base.

Most retrieval services offer an off-line, high-speed printout, usually mailed that same day, for the long bibliographies.

Data bases are typically developed, expanded and supported by an agency different from the information retrieval or time-sharing service that makes that data base available. Some of the more popular data bases are available through three or more such services and as high as 18 different vendors in the case of the National Bureau of Economics Research data base.

Hundreds of data base systems are commercially available, and there are many more out of the public domain with access limited to university faculty and researchers, scientific and technical organization members and other such groups. The federal government has over 4,000 scientific numerical data bases, some of which are available to the public by special arrangement.

Many new data bases are going on-line every month. The average data base is broadened in coverage and content and updated on a weekly or monthly basis. The current events or news-oriented data bases are literally up to the minute.

On-line data base systems are available from various kinds of vendors. There are firms calling themselves retreival services with multiple CPUs, gigantic storage capabilities and upwards of 30 or 40 different on-line data bases. Many general time-sharing firms offer one or more data bases as a part of their service, and there are small firms with their own network-coupled comptuter offering only one highly specialized data base.

system consists of terminal rental, telephone time, training, time spent on the terminal and off-line printing expenses. Most vendors provide local phone numbers through

(Continued on Page S/18)

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With the Trend to Distribution

Standards the Key to Data Base Interworking

By Frank E. Taylor
Special to CW

The last decade of computing history has been marked by a clear trend toward the greatly increasing use of on-line communications between user-driven terminals and computers and, more recently, between computing subsystems. This includes communication between mainframes where necessary, often as a much faster and efficient alternative to the use of off-line communications such as the transfer of magnetic media, and also between complementary subsystems such as those found within distributed systems.

Growing pressures on system designers are focusing attention on the alternatives of physically distributed portions of a data base which is logically one entity, or the replication of a master data base at several locations. This paper is primarily concerned with data base replication rather than distributed data bases.

It is timely to consider the means for transferring data bases between locations, and particularly between processing subsystems of differing manufacture, before such transfers become a necessity. When they do, we will inevitably find that we have a ready-made facility (if the profession has done its spadework effectively or we will have yet another bottleneck limiting the performance and effectiveness of systems.

File Interworking

Within a number of today's distributed systems, files are replicated in two or more interacting subsystems. In some systems such interaction only occurs on a daily basis. In the UK, one state-of-the-art distributed system involves a master computer that calls up intelligent minicomputer-based remote subsystems one by one.

Today's transactions are summarized and fed to the master computer for administrative purposes. Then the communications link is turned around and information generated by the head office is distributed by the master computer for use next day — e.g., price changes, staff instructions, etc. Interworking at the file level is thus with us, although UK experience shows it is relatively restricted to intracompany systems, ie., systems serving only one company.

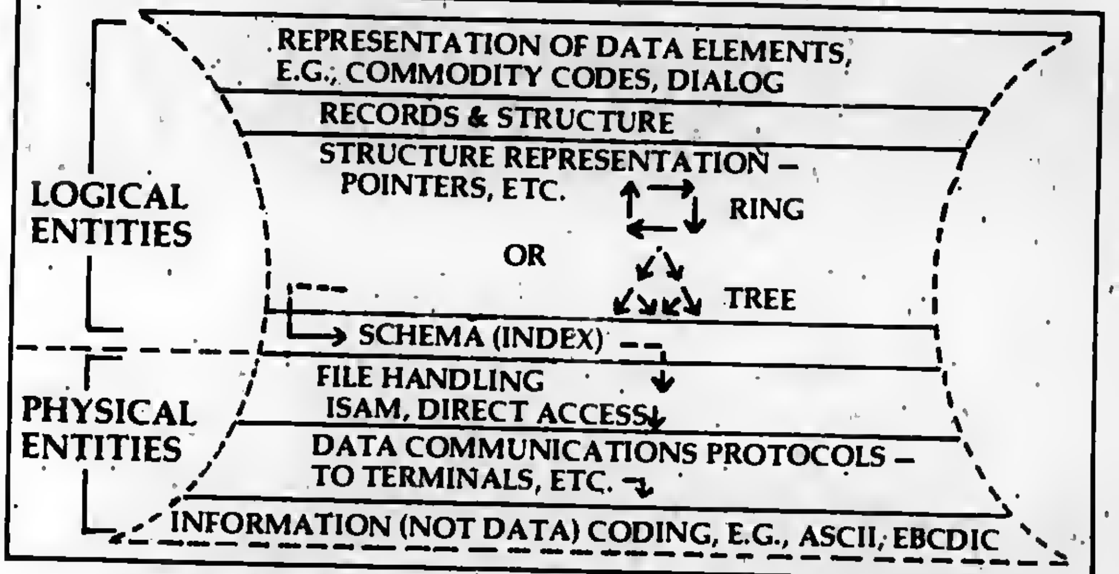
Interchange Requirements

When data bases are to be interchanged between differing subsystems — differing either in scale, size or manufacture — then there are two solutions. First of all, compatibility can be provided between any two subsystems by processing information within one subsystem in such a way as to make it compatible with the other.

This is often a relatively cheap solution to implement, although one which clearly has restricted application — normally with only two interlinked systems — and one which can rapidly increase in complexity if, within any one intercommunicating system, compatibility packages have to be provided to convert to the requirements of several other subsystems.

The other solution, initially more costly unless it is adopted by a large number of users, is standardization across the board. In the longer term, this is a much more satisfactory and economical solution. No standards yet exist for the general interworking of data bases, and in the remainder of this paper some other requirements will be examined in detail, as well as the state of progress.

Data base transfer involves examining a number of attributes of information, relating to both the logical structure of data and its physical structure and handling. The logical entities include the following, although the list is not exhaustive: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INFORMATION (NOT DATA) CODING, E.G., ASCII, EBCDIC
LOGICAL ENTITIES
PHYSICAL ENTITIES

Data Base Transfer — A Superset of Standards Requirements

- Standards for the representation of data elements, e.g., commodity codes, dialogue elements when standard transaction processing systems are used, etc. This area also extends to include standard messages, an area where work is just beginning.
- Standards for the sequencing and representation of information records within logical blocks, e.g., data definition languages and data manipulation languages, an area already attracting considerable attention, but not considered further here.
- Some form of shorthand representation of structure, i.e., hierarchical structure or network structure, sometimes alternatively termed "tree" structure and "ring" structure.
- Assuming the structure is known, then some form of index or "schema" must be transferred from one system to another — ideally using the same standards.

Physical entities complement the logical entities and include the following:

- The means used for file handling, e.g., index sequential, direct access or a combination of hierarchical methods and either of the preceding methods.
- The data communications protocols used in the widest sense — including the line level, the link level, the packet level if present and the means used to plan and manage transfers.
- The lowest level is one which is still important, although not only in the data base area. It is the codes used for coding information. Examples are Ascii and Ebcdic, which, as is well known, are not particularly compatible with each other.

Progress to Date

Some progress has already been made in standardization circles, to fit into the structure just outlined. For example, considerable progress is now being made toward the production of file labels that can be used to label the structure and contents of files within a given type of medium.

However, cross-media labeling standards have not yet been developed, and some conversions will be necessary between, for example, standards used on an exchangeable disk store and standards used within a collection of floppy disks.

In the communications area, here in Europe the Euronet information handling system, due to start work in 1978, is regarded as the pioneer system that will enable a number of protocols from the packet level downwards (including link and physical levels) to be tested in a live environment. The X25 interface, which was recently aligned with ISO's HDLC standard (Geneva, April 1977), provides a standard that embraces packet, link and line levels.

However, there is something of a credibility gap between the packet level, looking upwards, and the very few standards that exist within the higher level protocol area — e.g., the file label standards just mentioned. This is an area which needs to be urgently considered, in such a way that existing standards for information coding (where ISO has been active for some time), file labeling, data element representation and hopefully in the near future message representation can be incorporated into overall standards for the higher levels of protocol.

These will enable data bases to be transferred between systems on an open basis — providing "open systems interworking" — a phrase now frequently heard in Europe, and one which has attracted the attention of ISO, which set up TC97/SC16 in March of this year to study requirements. This area presents a tremendous challenge, but is an area where tremendous benefits will result from standardization — if it can be achieved in time, before a vast number of proprietary differing implementations and compatibility aids become reality.

Taylor is a consultant with the National Computing Centre, Ltd., Manchester, England.

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'Data Dictionary' Needs Its Own Definition

(Continued from Page S/3)

structural data required by the DBMS. (Does this fall under administrative aids or operational aids?).

Nonetheless, we have seen enough of the data dictionary system problem to formulate practical definitions. A data dictionary is a repository of information about the data base system; a data dictionary system uses this information to perform one or more of the functions discussed above.

Sources of the System

Who should implement the data dictionary system? There is an undercurrent of feeling in some quarters that the facilities we have identified with the data dictionary problem should, in fact, be integral to the DBMS. This is not necessarily to condemn current DBMS, but rather to say that there are important areas into which they could be evolving.

A merger of the data dictionary system with the DBMS is not difficult to envision. For example, subschemas contain considerable information about data usage, program security and the like. Also, it is easy to view "operational aids" as areas in which DBMS software could be upgraded.

Be that as it may, the data dictionary system as an in-house application system has been the rule in the past. The reasoning is simple: the implementation of a data dictionary system provides an excellent training ground in the technology of a newly acquired DBMS. It eases the transition to the data base environment and it represents low-risk to the corporation, since production systems are not directly involved. A data dictionary system is the perfect "first" application.

It turns out that this route is not always as rosy as it might appear, but even partial success (or partial failure) can be an important lesson to the DP department.

Finally, a data dictionary system can be acquired as a package, much as the DBMS itself. There is an increasingly good selection of commercial packages on the market. An important advantage of this source for a data dictionary system is the fixed cost of implementation — something not associated with the in-house route.

Also, commercial packages often address the specific shortcomings of the DBMS they support (important especially to Total and IMS users). Since they are generalized, however, they may be less well attuned to specific in-house needs.

Internal DBMS Support?

An additional question is often raised: Should the data dictionary be implemented using the DBMS for internal support? In other words, should the data dictionary be a data base like all other data bases? In-house data dictionary packages do as well. (IBM's DB/DC Data Dictionary is a prime example.)

The DBMS does, in fact, offer a significant potential for cross-referencing information in the data dictionary. A disadvantage, however, is that it restricts usage of the data dictionary system to only those environments where the specific DBMS resides.

Some attractive commercial systems avoid using the DBMS internally for just this reason and substitute their own quite impressive data management facilities instead.

Is a data dictionary system that is independent of any specific DBMS good for all others? (We might call this the universal data dictionary.) Given the variety in DBMS, it is difficult to imagine that this could be the case.

Ross is a member of the senior staff at Performance Development Corp. in Princeton, N.J.

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(Continued from Page S/3)

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Automates Shop Floor

TRW Teams With DEC for Mini DBMS

By Frank Cope
And Judi Suderman
Special to CW

EL SEGUNDO, Calif. — The manufaturing facilities of TRW's Defense and Space Systems Group represents a functionally and geographically diverse environment with both electronic and mechanical manufacturing. Although the manufacturing function is surrounded by a fairly high degree of automation, shop floor status and control procedures have remained essentially manual. The one exception was a DPI labor collection system. At the same time, shop operations provided a significant amount of input to other systems frequently entering the same information to multiple systems.

Late in 1975, the decision was made to automate manufacturing with the initial effort being in shop floor operations. Proposed operational requirements were 24 hours per day and 7 days per week use of the shop.

TRW had dual IBM 370/158s and checked whether they could be used, but found them to be unacceptable since it would take too much time to reprogram and cost too much to expand the hardware. The next approach was to use a distributed minicomputer.

Finally, the decision was made to use a stand-alone dedicated minicomputer with a remote job entry (RJE) link to the IBM mainframes and a real-time interface to the DPI-data collection system (badge reader).

The next step was to select a vendor and configuration for the proposed system. An evaluation team was formed which included applications specialists, business and scientific minicomputer specialists and a user representative from the manufacturing area.

The team developed a set of evaluation criteria that included hardware capacities, operating system functions, network and terminal management capabilties. This criteria was applied to more than 10 models of minicompuers and the Digital Equipment Corp. PDP-11/70, Hewlett-Packard HP 3000 and Prime Computer, Inc. 400 were selected for further study. A series of benchmarks was developed and each manufacturer was visited for orientation and test execution.

In the final evaluation, the primary factors considered included operating system performance, hardware cost, number of units installed, delivery schedules and the degree to which initial configuration could be expanded. Particular emphais was placed on performance and expandability.

The final selection was a PDP-11/70 with 512K byts of memory, three 88M-byte disk drives and 22 terminal devices.

As the detailed program design emerged, it became more and more obvious that some type of data management scheme was required for the application. The initial approach called for developing the data handling capabilities as part of the applications program. The file management approach of each manufacturer was given particular attention.

It was about this time that three key situations came to light. The data relationships and structures were becoming increasingly complex; Cincom was advertising a version of Total which ran on a PDP-11/70 under IAS; and DEC was about to release its own DBMS for beta test.

After extensive evaluation, including an on-site demonstration installation by Cincom, DEC's DBMS-11, a Cullinane IDMS adaptation, was selected for beta test and implementation, since it provided a broader range of functions and capabilities. TRW also felt that long-range support and operating system compatibility would be enhanced with a hardware vendor-supplied product.

A DBMS development team was formed, consisting of a team manager, a DEC software specialist, four system designers and nine technical programmers. The team was responsible for the system design, application development, data base administration and operating system support. Two people from the user group were in contact with the development team.

The initial data base was designed, coded and implemented in four weeks by the DEC specialist and a TRW system designer. This speed was in a large part due to extensive use of the Codasyl hierarchical network data base which features flexible set linkages, set membership options and set retrieval options.

Three months after the implementation of the initial data base, Phase I went into production. The Phase I data base consisted of 13 subschemas, 19 record types, 21 sets and five areas. Phase II, with a data base of 40 subschemas, 62 record types, 56 sets and nine areas, is now being programmed.

The TRW choice of DEC DBMS-11 has satisfied the user need for a short implementation schedule, low equipment cost, expandability from six to eight additional manufacturing shops and system reliability.

Cope is the project manager at TRW in charge of the DBMS evaluation and installation described here; Suderman is his counterpart on the project for DEC.

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With Added Software 'Layer'

System Simplicity Gives Control Over Changes

By Glenn B. Harvey
Special to CW

Most computer service managers will agree that their control over changes is much less than they would like and that their lives would be easier if a better way to exert control could be found.

Many systems, of course, have been developed, advertised, installed and used with great shouts of success. These include retrieval systems, query packages, operating systems, compilers, file access methods and more generalized systems support.

At DePaul University, we examined many such systems, starting in 1971. The data base package selected was Total from Cincom Systems because of its low cost, minimum memory requirement and well-established market position.

But Total did not appear to offer the answer to changes without some additional control apparatus, perhaps a new layer of software between the data base package and the application program. We had read about data element dictionaries and table-driven systems. These ideas appealed to us, but we had misgivings about our ability to develop them effectively.

We learned Amherst College in Massachusetts had developed an embryo generalized maintenance and retrieval system using Total for the data base. It was a dictionary-driven system that worked well.

High Expectations

We elected to build the DePaul data base with the foundation provided by the Amherst system. We recognized our own peculiar problems along with those of other shops with which we were familiar. In any case, we created new software, which we call the Application Control System (ACS), and which was meant to be responsive, flexible, simple, self-documenting, parameter-driven, user-controlled, easily converted and economical.

Initial hardware for ACS was a 96K IBM 360/30. This was followed by a 192K 370/135 and, last February, by a 512K 370/138. We provide services for administrative users throughout the university. The data base, including ACS, has been fully operational for over four yars and we consider it an unqualified success.

ACS can be called a data management system by some definitions. It

(Continued on Page S/21)

Data Base Gives Business Model

(Continued from Page S/2)

tional responsibilities and so on. Thus the output control function must be geared primarily to support output demand.

Data Remains Constant

Rarely in a properly developed data base should changes in output requirements cause changes in the data base input control function. This is usually because the information required to satisfy 80% to 90% of management's decision-making needs is, in most companies, developed from combining, arranging, analyzing, sorting and reporting the same basic data elements. From the same basic data elements, thousands of different demands for output can be supported.

In addition to the generalized input and output functions, a data base will be supported by a storage and processing control function. This function manages the data base itself, receiving data from the input control function and passing it, on demand, to the output function.

The processing and control function is an independent data base management function with built-in capabilities for controlling backup, recovery, data availability, security, computer efficiency, etc. It is generally controlled by an individual called a data base administrator.

The processing function also controls the data base's physical structure. This structure is not static. It must respond to needs for optimizing efficiency and cost-effectiveness.

The control function is not completely free from data redundancy. Redundant data is purposely used to improve computing efficiency and reduce processing time and costs. The processor employs data base management software to maintain data independence and to provide maximum control over the physical structure of the data base.

The storage and processing function reflects the basic work structure of the company. It represents internal departmental functions and recognizes the logical interrelationships between departments. Its view of the company is the one that recognizes all the intricacies of how work flows from department to department in terms of basic activities and tasks.

Yet in a very real sense, the processing and control function ignores departmental boundaries, concentrating instead on tracking and logical relationships among work tasks and their related costs and schedules.

Dottore is a systems project leader at St. Regis Paper Co. in New York City.

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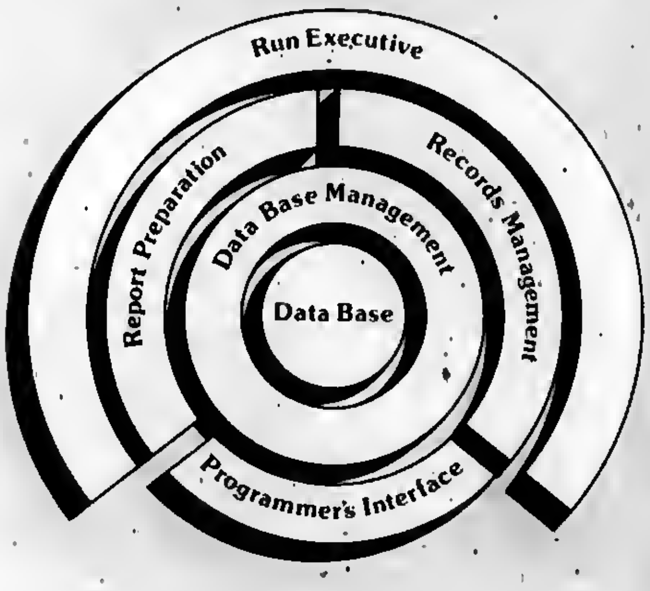

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Users Urging Move to Data Base Distribution

By Grayce M. Booth
Special to CW

Information systems have become increasingly data base-centered over the past few years. Originally the focus in information processing was on computation; today it is on the generalized storage and manipulation of data. The typical state-of-the-art system today supports on-line access to a large data base shared by many applications and many terminal users.

The key to the success of these systems is the integrated data base, whose organization can be structured to model real-world data relationships. Charles W. Bachman — then of General Electric and now of Honeywell — first embodied this concept in the Integrated Data Store (IDS) software in the early 1960s. Since then, vendors and users have invested large amounts of time and money in researching and developing centralized bases integrating data from multiple functional areas.

Today users are learning to live with data bases, working with vendors to gradually resolve the technical challenges they present — overhead, complexity and control.

As usual, however, the information processing community is eager for new and better capabilities, and the cry "distributed data bases!" is arising with increasing frequency.

The current popularity of minis, and the resulting trend toward distributed processing, leads naturally toward distributed data bases. But this term — like "distributed processing" — means many things to many people.

Ideal Distributed Data Base

Ideally, the user would like a distributed data base to be a "virtual filing system." Data would be stored at many locations, but with any data element equally accessible to any authorized user at any location. The user would know nothing about the distribution of the data. Elements stored in Hong Kong would be as readily accessible as those stored at a local center, possibly with slight delays due to long-distance transmission.

While intriguing, the "virtual filing system" remains impractical until certain major breakthroughs are made.

First, data communications technology must provide higher speed transmission at low cost and with low error rates.

We will have to learn how to partition an integrated data base across multiple locations, how to handle complex error and recovery situations, how to control multiple users of the data base and how to provide the needed levels of data privacy. These must be explored in depth before "virtual filing systems" become commercially available.

In the meantime, of course, there are practical ways of building distributed data bases within today's state-of-the-art to meet the current needs of applications such as on-line banking and manufacturing control.

Taking a closer look at distributed system trends, they center around the tie-in of minis to larger host computers. Many users have medium- or large-scale computers to which they may be connecting minicomputers to combine the power and capacity of the general-purpose computer with the convenience and simplicity of the mini.

In systems of this type there is a typical progression in the use of minis. The first step is often mini-based data-entry terminals, providing editing and formatting capabilities. At this stage the data base remains centralized at the main — or host — computer.

The next step frequently involves building a small read-only inquiry data base at each mini, so that the mini becomes a satellite processor. Typically, the data at each satellite processor is a partial copy of the host's data base, forming a replicated distributed data base.

As long as the data stored at the satellite is used for inquiry only, the problems of distributed data base update synchronization can be minimized by refreshing the local data once a day from the host data base. Since many on-line applications are active only during daytime hours, it is often convenient to refresh the data

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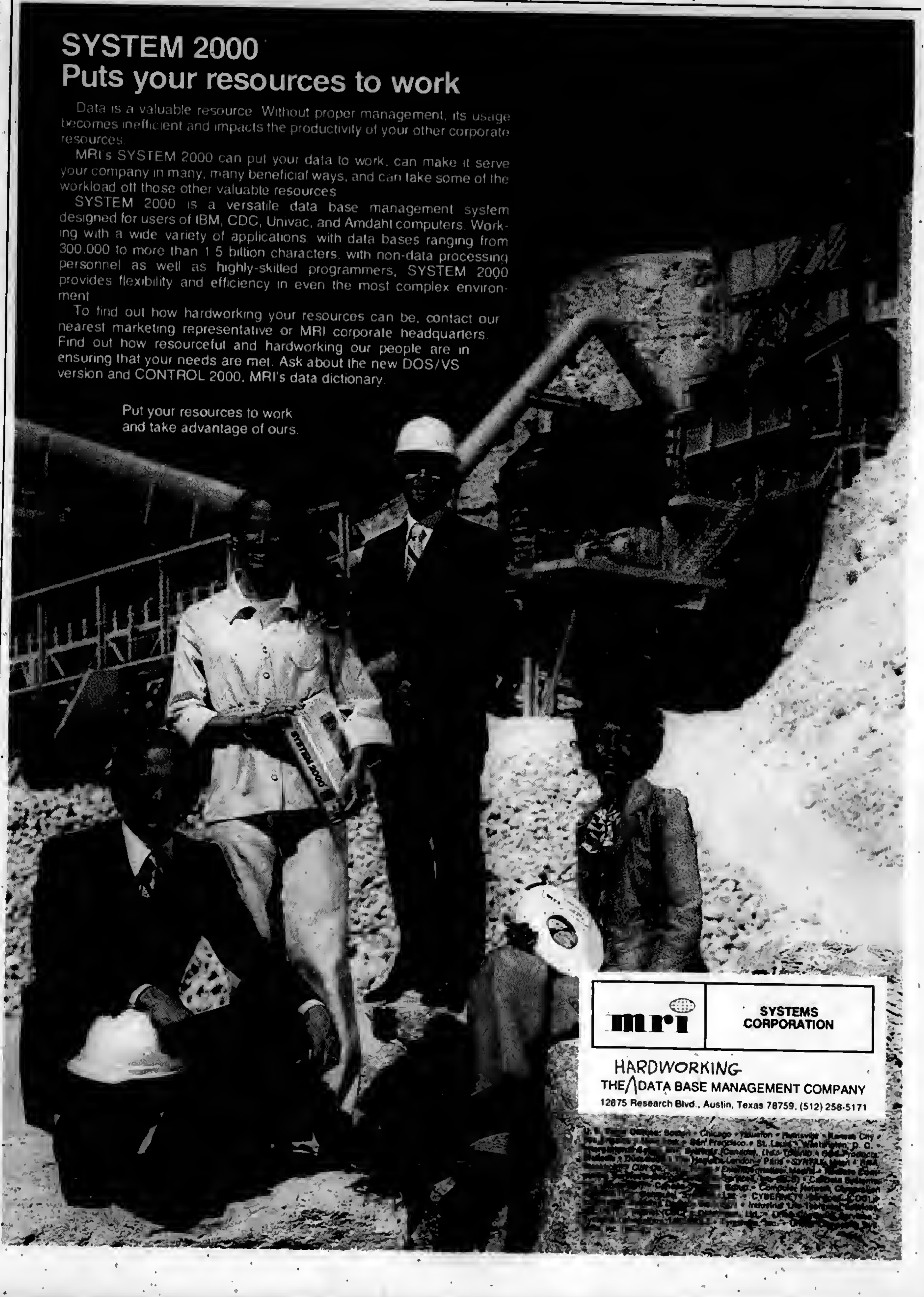
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Beware Vendor's Pitch — DBMS Not a Panacea

(Continued from Page S/4)

somehow find the elements requested, on a series of files organized (suspiciously) a lot like the old traditional files.

Remember, however, we got rid of all that nasty redundancy; so the DBMS does a few extra "gets" to procure some fields that might have already been present in the traditionally redundant file. The program also needs to add elements to a file and this requires, although transparent to the programmer, that physical records be added to the files. The DBMS must then update linkages amongst its other duties. This all takes time.

Request Comes In

Now that everything is out on our data base and our DBA is in complete control and we're reconciled to the trade-offs we've made with processing efficiency, we're ready to tackle ad hoc requests.

A vice-president asks for an unusual report. Alas! The programming staff is busy on a priority project. It is two days before work can start on the unusual report and it takes another three days to code, test and debug the program and another day to get it into the operations schedule.

Enters the vendor: "If you had purchased/leased our Super Inquiry Language Translator (Silt) your vice-president could have written his own program and had it executed without even being compiled. Of course, to be effective, Silt must be supported by Data Ultimate Definition Encyclopedia (Dude) so that the end user knows what stuff he's working with. It would have only cost you another $20,000 to $25,000 over our base sticker price, for both."

Outside of the cost, it sounds like a pretty good idea. Unfortunately, the vice-president doesn't want to learn how to write things such as, "(IF HIRE-MO > 7 AND HIRE-MO < = 12 THEN WRITE ELSE BYPASS)" or "(BRANCH H '36' DROP)." So the job falls to the programmer who still can't start on it for two days. It's easier to write with Magic-Silt-Dude but all of the steps associated with developing a traditional program still exist to some degree.

The vice-president is inclined to say, "Why the heck did we spend several thousand dollars on Matchtrick, Slit and DUD anyway?" Why indeed?

Who Needs It?

The key, I think, is that anything DBMS can do, the well-designed traditional system can do just as well if in a different way. There are many computer centers doing fine with the "old" methods.

Wow! DBMS is really worthless!

Not true. There is a case for DBMS packages. The basic tools are packaged and ready to use if you determine you need them.

Ask yourself a few questions:

- Are we in trouble with our current data management patterns?
- Do we anticipate growth that will make our files, programs and overall system considerably more complicated?
- Do we spend a large amount of our time on program maintenance?
- Are we backlogged on new applications and/or ad hoc requests?
- If we develop a positive plan to improve information processing will we be afforded the required time and resources to implement it properly?
- Would management be able to truly dedicate sufficient time to a redesign effort?

How to weigh your answers is self-evident. Depending on the severity of your particular problems you may legitimately opt for DBMS.

If you want DBMS, consider a few more things. Your staff must be receptive to change to a new concept. You must have a firm commitment from management. Your original DMBS application should be a fairly small one, allowing your staff to build expertise gradually before attacking bigger game. Get the front-end work done before delivery of the DBMS package.

But remember, a DBMS can't be installed overnight and it's not a panacea.

Cox is a systems analyst in information services at Associated Freightways, Inc., Grand Rapids, Mich.

Distributed Confusion

There are almost as many approaches to distributed processing as there. By letting your needs dictate the right solution, Hewlett-Packard can help

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The executive software is so advanced that it will remain the heart of our computers for years to come. So you can keep adding to your system without having to throw your old programs out the window.

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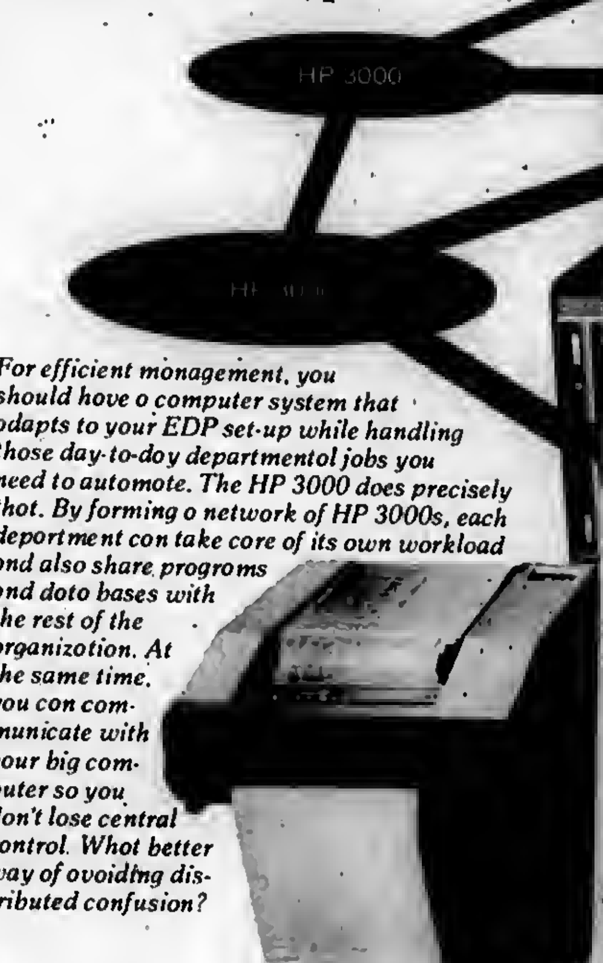
The HP 3000: The system that makes it all seem simple.



For efficient management, you should have a computer system that adapts to your EDP set-up while handling those day-to-day departmental jobs you need to automate. The HP 3000 does precisely that. By forming a network of HP 3000s, each department can take care of its own workload and also share programs and data bases with the rest of the organization. At the same time, you can communicate with your big computer so you don't lose central control. What better way of avoiding distributed confusion?

47703HPG5

For Traders, Portfolio Managers

Bond Analysis Helps Simplify Securities Mart

Special to CW

NEW YORK — An interactive Bond Analysis System (BAS) that enables traders and portfolio managers to quickly spot favorable price/yield opportunities has significantly increased earnings for First Pennco Securities, Inc., an underwriter and market maker in fixed income securities.

In operation since February, BAS provides comprehensive monitoring of U.S. Treasury and Agency notes and bonds, selected money market instruments, mortgage-backed bonds of the Government National Mortgage Association (GNMA), Treasury bill futures and GNMA futures.

"Before 1974 there was no need for compterized capability in these markets, but the recent proliferation of issues has made it increasingly difficult to identify timely moves for better returns on investments," Dr. Joseph Bench, vice-president and economist for the firm, said.

The extensive analytical capabilities of BAS were developed on XDMS; an integrated data base management system provided on the time-sharing network of Interactive Data Corp., Waltham, Mass.

A general-purpose system, XDMS features a flexible English command language for defining, creating and maintaining data bases and screening data into a wide variety of formatted reports.

"We wanted the greatest flexibility possible in data base management and selected XDMS largely because of its random access capabilities and ease of operation," Bench observed.

Buy or Sell?

BAS is a fully conversational on-line system for analyzing historical trends, relationships and interest spreads among all issues in the data base, which contains daily closing prices and/or yields as reported by the various trading desks at First Pennco. Data can be screened by particular issues or by market sectors to uncover favorable buy and sell opportunities, plus advantageous arbitrage situations. (Arbitrage is a technique used to take advantage of price differences in similar securities, through buying an undervalued security and selling one that is overvalued simultaneously.)

For First Pennco, which does an annual volume of about $1 billion in arbitrage, BAS is bringing strong results. The firm's earnings for the first six months of 1977 were $1.4 million, compared with $1 million for the same period a year ago.

"In many cases, our annualized rates of return in relation to the amount of capital at risk have increased more than 100%," Bench pointed out.

A key factor in the success of the First Pennco system is its computerized model of historic fixed income spread relationships, which it says is the first to be based on executable rather than theoretical quotes.

Jack Hauptmann, First Pennco assistant vice-president who guided the development of BAS, noted the model is "a practical and finely tuned analytical tool for generating a continuous stream of recommendations for arbitrage situations."

With a minimum of typing input, users of BAS can:

- Generate daily closing quote sheets on U.S. Treasury notes and bonds and selected money market instruments.
- Display historical trading activity of any particular issue up to 250 consecutive days.
- Conduct historical spread analyses between any two issues, via traditional statistical measurements in tabular or graph formats.
- Obtain multiple yield curves on U.S. Treasury issues.
- Compute yield maintenance prices for trading in GNMA futures.
- Examine all available opportunities for maturity extension or maturity shortening.

"Starting with the daily executable quotes, anyone with a portfolio in the government or

(Continued on Page S/20)

are computer companies offering them.
you clear up the confusion.

Turning raw numbers into usable information.

Your big computer has data base management to consolidate related information into easily accessible files. This capability is just as important at remote sites.

It allows your key people to call up the facts they need instantly, and get them in an easily understandable form without wading through reams of paper.

The HP 3000 has an extremely effective data base management capability. With its help, the computer will generate forms, titles, page and column headings, data sorted by categories, subtotals, totals and averages. And, through DS/3000 software, you can call up any HP 3000 data file in your network.

Data base management on the HP 3000 has proven so efficient that it was recently named to the Datapro Software Honor Roll, placing it among the 38 top software products in the country.

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So if you want to take the confusion out of distributed processing, now and in the years ahead, call your nearest Hewlett-Packard office listed in the White Pages. Ask for a Computer Systems representative. Or write for more information to Bill Krause, Hewlett-Packard, 11000 Wolfe Road, Dept. 304, Cupertino CA 95014.

HEWLETT hp PACKARD

Data Bases Moving Toward More Distribution

(Continued from Page S/13)

at the satellites each night.

The next evolutionary step may involve satellite data copies which are updated on-line. In this case, synchronization problems can be minimized by updating only the satellites' data base segments during the on-line day. At night, those same updates — possibly in summary form — plus any updates from other sources, are applied to the host data base.

On completion of this update, the satellite data copies are synchronized to match the host data base, and the system is ready for the next day's on-line processing. Of course, if there are no updates other than those entered at the satellites, there is no need for redistribution from host to satellites.

Distributed Software

All of these modes of use are well within today's state-of-the-art. However,they do require a capable set of data base management software at the host and the mini. This distributed data base software must include:

- Compatible Data Base Structures for the Host and Mini. Although the data base segments at the minis will not be as large, or as complex, as the host data base, the same structures are required at both. Otherwise, complex transformations of data and structure may be required each time information is moved within the system. The ideal situation is for the mini to support a compatible subset of the host's data base structures and access methods.
- Data Base Transmission. Distributed data base use calls for moving parts of the data base between computers. This may require a data communications capability for high-speed transmission (50kbit/sec or higher) between the host and mini. "Transparent" data movement must be supported, so that any code set — including binary data — can be sent. In addition, routines to transmit selected portions of records for update and/or selected records for replacement are desirable.
- Flexible End-User Facilities Today's distributed systems are oriented toward on-line applications and typical users are not programmers; they are "end users" who think of the computer as a tool, easy to use and quick to interface to the data base must be simple, flexible and geared to each application.
- Host/Host and Mini/Mini Interface. Although the main emphasis today is on the linking of minis to hosts, the capabilities just described make it equally feasible to configure a distributed system and data base using multiple hosts or multiple minis.

With compatible hosts or minis, the same data base structure is available at each. Data base transmission requirements are the same as for the host/mini tie-in. Finally, the need for end-user facilities is the same when multiple hosts or multiple minis are used.

Therefore, as a "fall-out" of the developments needed to support data bases distributed across a host/mini combination, there exists a capability to configure a distributed data base either on multiple medium- or large-scale computers or on multiple minicomputers.

One probable evolutionary step in distributed data bases will be a transition from replicated to partitioned data bases. In a host/mini tie-in, the data stored at the mini will no longer be a copy of part of the host data base. Instead, each host and mini will maintain a non-redundant segment of the entire distributed data base.

Today, it is difficult to ensure the integrity of a patitioned data base, because damage to — or loss of — any segment may affect the entire distributed data base. Future experience and research by data base technologists will undoubtedly indicate solutions to this problem.

An enormous expansion of demand for end-user facilities will occur during the 1980s. Most distributed data base access today satisfies predefined needs. Future usage will be oriented toward answering unforeseen questions, making a company's valuable data assets play a more timely role in day-to-day operations. The distributed data base software must be expanded accordingly to meet these new requirements.

It is, therefore, possible to envision a gradual progression, through experimentation and learning-by doing, toward the "virtual filing system" which is the goal in the evolution of distributed data base technology.

Booth is a project manager for special projects at Honeywell Information Systems, Phoenix, Ariz.

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Predefined Data Bases Accessible

(Continued from Page S/7)

their own system or an independent network. There may be initial or subscription fees payable to the agency that owns and supports a particular data base.

Practice Makes Perfect

Several drawbacks may exist for the casual on-line searcher. Each vendor uses a different set of commands for access and control with an even greater array of output formats. However, these problems can be overcome with a little practice and study. Each data base has its own little quirks and some degree of training, usually at the users expense, is required to extract the last ounce of efficiency from any one vendor's search, retrieval and command software.

With bibliographical data bases the full text of a reference is not available on the home terminal. It must be obtained from the original source or from a library copy. This is still giant steps ahead of not knowing the reference existed in the first place. At least one vendor is offering a method of ordering full text copies from any one of over 5,000 sources right from the terminal during a search.

Using the most conservative estimates, by the year 1981, there will be over 500,000 on-line searches per month in the U.S. of just bibliographical data bases. With a little vision, the not too distant future of electronic funds transfer and electronic mail could have authors who write for electronic publications that exist only in the memories of computerized retrieval services.

Gregory is president of Gregory Research Associates of Philadelphia, publishers of a loose-leaf directory entitled "Remotely-Accessible Conversational Programs and Data Bases."

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rapidata

Increase Throughput

Data Base Machines Relieve CPUs of Overhead

By Michael L. O'Connell
Special to CW

As hardware technololgy progressed in the 1960s, we developed very sophisticated computer systems dedicated to our burgeoning communications requirements. The result is today's "front-end" computer, a special-purpose system devoted to collecting, storing and presenting data to the more general-purpose computer connected behind it.

The benefits to be gained from isolating special functions into special machines have been proven, at least in that environment in which the special function is communications. The same principle is now being applied when the special function is data base access. The configuration of such a system is a mirror image of the communications front-end configuration, and the functions performed by both the front end and rear end are identical: collect, store and present data to the general-purpose processor. It might look like the configuration in Figure 1.

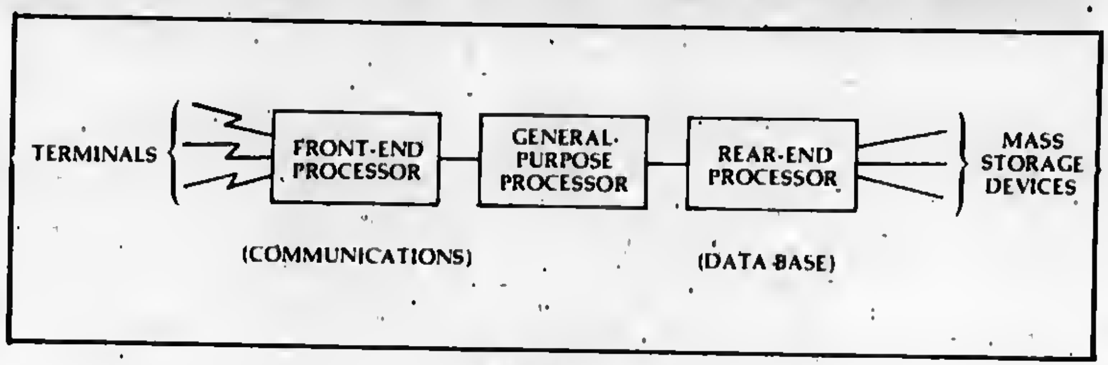

Figure 1.

Just as a communications machine is used to concentrate messages from multiple terminals for use by a single general-purpose computer, the data base machine collects data from multiple data bases. The data base machine can also service multiple general-purpose machines.

Many Advantages

Advantages of the data base rear-end machine include the following:

- Higher Throughput. The rear-end machine is really a multiprocessor, since it operates in parallel with the general-purpose machine. That means that the sometimes high overhead associated with the many input/output operations required to finally locate the data base record needed by the application program can be overlapped with productive work being done by the general-purpose processor on behalf of other application programs.

In addition, the system software in both the general-purpose processor and the data base machine can be more efficient, since the vendor can specialize each system to the specific task it must perform; i.e., two special-purpose software systems, working together, are more efficient than one general-purpose software system.

- Lower DBMS Maintenance Cost. The DBMS is specialized and isolated in its own machine environment. Therefore, enhancements and maintenance can be accomplished without regard to possible impact of the changes on the general-purpose operating system. Testing of changes is also more efficient, since the possible impact of the changes is much more localized than it would be in a larger general-purpose system.
- Lower General-Purpose Conversion Cost. When the existing general-purpose system is replaced, having the entire data base system in another machine vastly simplifies the job of rolling out the old and rolling in the new. The system software being replaced in the general-purpose system has very little code pertaining to the data base system, so that very little data base code needs to be replaced with the installation of the new system. Of course, the code in the general-purpose system that sends requests to the data base machine and receives responses from it must be replaced.
- Higher Data Integrity. The data base machine is the only machine that has access to the mass storage devices that contain the data base. The interfaces to the data base machine are cleanly defined ones, since they are the external interfaces to the general-purpose machines. Therefore, the chances of polluting the data base through simultaneous, conflicting requests are greatly reduced.
- Greater Security. For much the same reasons that data base integrity is greater, data base security is much better. Unauthorized requests for data base access, whether intentional or not, are much better identified and controlled when the entire machine is devoted to acting as a filter between application programs and the data base.

The interface between the two machines is most easily seen as a high-speed, serial path. To the general-purpose machine, the data base machine appears to be a tape drive or a

(Continued on Page S/20)

Guess who gets to do Replacement Cost Measurement this year?

Last year was the first time the SEC required major corporations to undertake replacement cost measurement. Complying with Accounting Series Release 190 (ASR-190) was a struggle. For the most part, the job was done manually by staff. It took loads of time, cost plenty of money and so companies are now looking for an easier way to do it.

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Multiple DBMS Work With Little Redundancy

(Continued from Page S/2)

HP's user manual are for an alumni data file. Since the manual is easy for a novice to use, there was very little training necessary for the initiation of the alumni DBMS, which handles over 2,800 alumni.

The college selection data base of over 2,600 two- and four-year colleges is leased from Time-Share Corp. of Hanover, N.H. Time-Share provides the DBMS (called The Guidance Information System or GIS) for the extensive college file. The firm also provides thorough documentation and on-site training for guidance personnel, who use the file to help students select a school suited to their needs.

The Marist Student Records Accounting System (Marad) was developed in-house over a period of five years. In addition to serving as the DBMS, the 200+ program package handles scheduling, report cards, attendance accounting and a variety of report generations.

Like the Findit and GIS systems, Marad is written in the HP Extended Basic programming language and will run on either HP's F system or the more recent Access system. Though Marad was developed in-house, its development cost was very low, due to the availability of very energetic volunteer student programmers.

For example, Steve Endres, grade 10, single-handedly manages the computer room and James Thomas, now in grade 12, as a ninth grader wrote the permutation generator for the scheduling programs.

Marist would like another 23 M-byte drive to permit more CAI usage in its seven-terminal math lab and expanded applications in library, financial and student programming.

But the school is happy with the multi-DBMS it has now. It would structure the system basically the same way, if starting over today, because the flexibility is worth the small price paid in data redundancy.

Caskey is dean of studies and director of computer applications at Marist School in Atlanta.

DBMS Can Be Off-Loaded

(Continued from Page S/19)

very high-speed terminal attached to the interface.

Each application program request of the data base machine is sent over this path as though it were a tape write operation. Information returned from the data base machine could then be treated by the general-purpose machine as though it were coming from a tape drive or high-speed terminal. The system software necessary in the general-purpose processor is relatively simple, compared with the complexity of the DBMS.

There have been a number of research and development projects undertaken in the past few years to explore back-end data base processors, such as the work done at Bell Labs and by Cullinane Corp. I believe that in the next year or two, when more is understood about the performance and maintainability of such multiprocessor combinations, we'll start to see some very attractive products appear on the commercial market.

Another interesting approach to the problem is to view intelligent disk controllers and channels as true processors and to build them to perform some of the time-consuming tasks involved with searching a data base. A single request from an application program, such as finding a specific record with a given set of values in several data items, can easily result in the necessity of searching hundreds of records.

That evaluation could take place in the mass storage controller, without interrupting the main processor each time another candidate record is retrieved. Tables of pointers which are stored in the data base, and chains of records connected by pointers, could easily and quickly be scanned by an intelligent controller, thus freeing the main processor to do work on behalf of another application program.

All the benefits mentioned earlier can be gained with today's hardware and data base technology, but future use of microprocessors and associative memories will bring even greater gains to the user.

O'Connell is chairman of Codasyl's Data Definition Language Committee and Manager of Product Management and Technical Support at Digital Equipment Corp.

System Analyzes Securities

(Continued from Page S/17)

agency area can instantly analyze the best actions for protecting and improving their position," Hauptmann said.

"For example, BAS enables effective securities swapping by monitoring those that are out of line with other market sectors in price," he said. "It will also pick out profit opportunities among issues with similar maturities or in moving into longer or shorter maturities."

Pictorial displays of yield curves on Treasury notes, which can be presented through BAS, can sometimes reveal pivotal trends that are not easily recognized, Hauptmann added.

In using XDMS for its bond analysis program, First Pennco was able to incorporate existing machine-readable files, as well as meet new data base requirements, with only one data base definition.

All conversation with BAS is in English, using the vernacular of the bond industry. In addition to prompting a beginner through all steps, the system also allows experienced users to "stack" multiple input parameters on one line, suppressing prompt messages and saving processing time. Standardized input eliminates the need to memorize rules for entering data values.

First Pennco plans to expand the capabilities of BAS. "Initially, we have concentrated on the asset side of the balance sheet, but later we will get into more liability considerations," Bench said. Areas being explored include optimum scenarios for deciding types of debt instruments to be employed, effects of interest rate assumptions on yield curves and more accurate evaluations of municipal bond values.

BAS is being offered to other users by First Pennco on a fee basis, plus computer time charges.

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Software 'Layer' Gives Control Over Changes

(Continued from Page S/12)

has four basic parts:

- Generalized Maintenance System (GMS). A single batch job stream handles maintenance of files in the data base. Transaction entries are broken into their component data elements which are then edited, updated to the appropriate data base file, logged and reported out to user offices.
- Generalized Retrieval System (GRS). Again a single batch job stream, it can retrieve data from any part of the data base. It develops output record streams that can be manipulated through sort, merge and match utilities before printing in any desired format.
- Generalized Teleprocessing Support. This is made up of two Cobol programs one of which performs an abbreviated version of the update functions of GMS, while the other performs an abbreviated version of GRS.
- Generalized Utility System. This is a single batch job stream to manipulate files (data sets) and their linkages (relationships) en masse to accommodate new files, new links, expanded files and larger record sizes.

Less than 15 Cobol programs constitute the entire ACS. Simplicity is stressed throughout the system. Tailored programming of application details is typically all the coding needed to bring up a new application system, along with several parameter sets that are entered in what we call Control Data Sets (CDS).

Even the tailored programming is done within a skeletal framework of an existing program and usually requires less than two weeks for the most difficult task.

The programs that make up ACS thus become the fundamental basis for control. Their functions establish the standard for all data base operations in the shop, the core around which all application systems are built. Where data base elements, records or files are concerned, each of the programs seeks its specifications from a CDS, not from its own Data Division.

Program Independence

Since the specification in a CDS is separate from the program, true program independence from the data base is achieved. In our ACS, CDSs are stored in the data base like other data files, but they could be maintained outside that structure.

A crude definition of CDSs could be "files or data sets that contain tables of specialized codes or specifications that can be used by an application program to drive its own operation. While many forms of software involve tables, only application-specific tables like those found in data dictionaries are considered in the DePaul ACS.

The Data Division of a Cobol program doesn't exist in the normal way; rather, we leave space for a table of codes or statements. Such a program is dumb and depends completely on directions received form the CDS tables accessed at execution time. Thus data base "binding" occurs at run times — the acknowledged best point to insure data/program independence.

Additional benefits from the ACS approach include better documenation, single-source entry of application specifications and immediate response when element specifications are changed. Of course, no compiling of programs is required to reflect changing conditions.

Almost any DP operation can benefit from the notion of creating simplified standard job streams, like an ACS, and basic CDSs that are used by these programs. Only four or five logical data sets are required:

- A data element dictionary contains all the system needs to know about an element, leaving extra space for new ideas later.
- Documents that can enter ACS including arrays of elements under a common form or document ID. This can also hold teleprocessing screen formats for I/O display and updating.
- A data set that provides displays of element values extracted by the system: each has a unique display ID which may equate to report number, parameter set number, etc.
- A listing of users, files, data base controls and descriptions pertinent to the environment in which the system resides.

A fifth data set, an extension of the dictionary, contains data values for an element, for purposes of input editing or output translation from a code to an expanded description.

It is significant that no formal data base is really needed to support the suggested CDSs. Effective ACSs have been constructed using Isam, Vsam, Bdam or other non-data base access methods and file organizations.

The ACS functions of data collection, editing, updating, retrieval and reporting must still be programmed to work with CDS in the environment chosen. Whenever a shop develops its own ACS, it typically takes about one man-year or a couple of eager beavers around six months to come up with the basic system.

Use of ACS and CDS can have many benefits; mistakes are easier to correct, time schedules are easier to meet, staff is far more productive, and existing systems can easily interface with GRS record streams.

Harvey is director of computer services at DePaul University. This paper was extracted from a presentation he made at the annual meeting of the Association for Educational Data Systems (Aeds) earlier this year.

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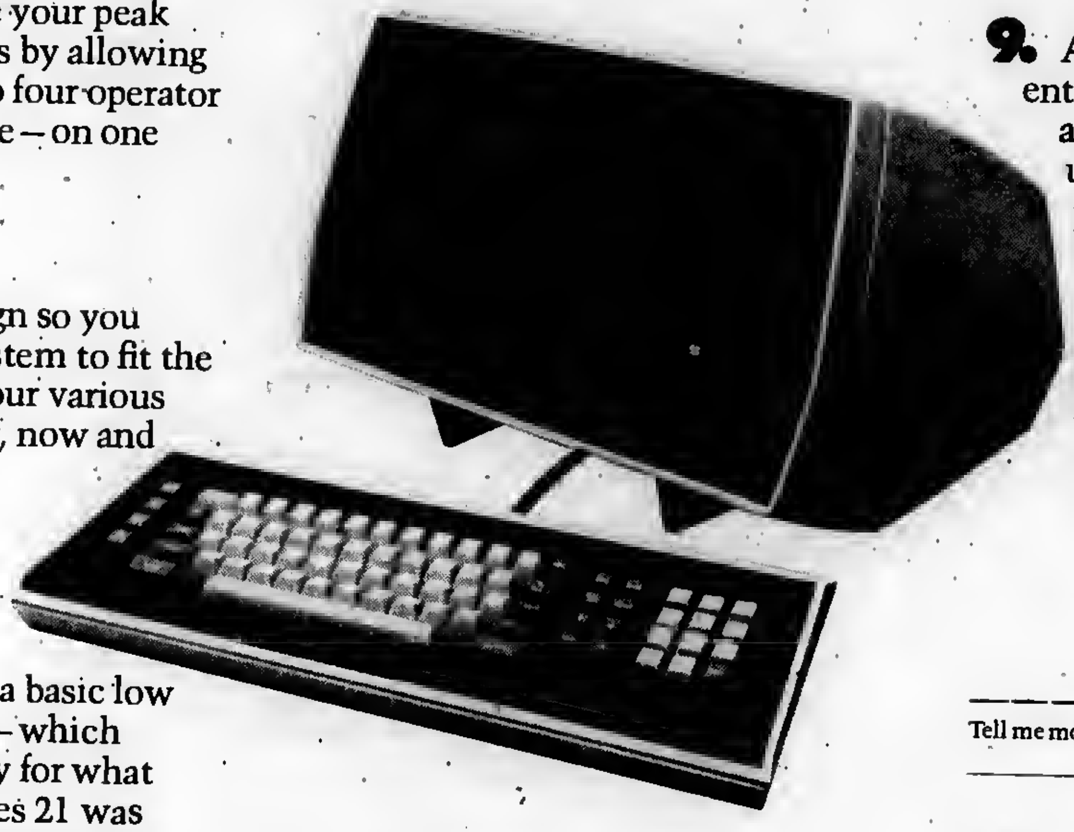

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ANAHEIM, Calif. — A floppy-disk-based development system for users of the R6500 microcomputer family and a single-board system for PPS-4/1 microprocessor applications have been introduced by Rockwell International.

The basic configuration of the System 65 floppy-disk system is two built-in disk drives and 16K bytes of static random-access memory (RAM) plus read-only memory (ROM) based resident system software. Since the system monitor, text editor, assembler and symbolic debug programs do not require disk or user memory space, full disk storage and user memory are dedicated to the user's program.

Supports Terminals

System 65 supports a variety of terminals with serial data rates from 110 bit/sec to 9,600 bit/sec and also provides a way of developing and debugging new products, the firm said.

The single-board development system, called the XPO-1, performs the basic functions of assembly and debug in designing PPS-4/1 one chip microcomputers.

It is contained on a 7.5 by 12-in. circuit board on which is mounted a 20-key keyboard, a five-digit LED display that presents the address and data at various locations, a 1K by 8 RAM, additional sockets for a second optional RAM and teletypewriter interfacing circuitry that permits connection to a teleprinter or other terminals.

In addition, by plugging in the selected development circuit and the corresponding assembler microcomputer, the same XPO-1 board can be used for development of all Rockwell's one-chip microcomputers that are members of three PPS-4/1 families.

The System 65 sells for $4,800 and the XPO-1 development system costs $495. Additional information can be obtained from the Rockwell International Electronic Devices Division, 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Micro Bytes

Tektronix Option Lets 8000 Emulate 8085

BEAVERTON, Ore. — Tektronix Inc. has introduced an 8085 option for its 8000 series Microprocessor Labs.

The .8085 package costs $1,850 for the emulator and $850 for the control probe.

Tektronix can be reached at P.O. Box 500, Beaverton, Ore. 97077.

Self-Study Course Offered

SAN DIEGO — Electronic Product Associates, Inc. has published a 90-page self-study course for its Micro-68a training computer.

The lab manual contains 13 chapters, with each chapter making up a complete lesson on topics such as I/O, interrupts and the use of a basic instruction set, according to the vendor.

The lab manual costs $5 from the firm at 1157 Vega St., San Diego, Calif. 92110.

'Micrograbber' Aids Testing

PAMONA, Calif. — The "Micrograbber," from ITT Pamona Electronics is designed for use in testing high-density packaging.

The Model 4233 is 38.86mm (1.53") long and works with a plunger-type action between the thumb and two fingers. It is molded of glass-filled nylon and can withstand temperatures of 240°C (464°F), according to a spokesman. Other features include a stainless steel spring beryllium copper contact and gold plating.

It can be ordered for $1.00 from ITT Pomona Electronics, 1500 E. Ninth St., Pomona, Calif. 91766.

Catalog Describes Multiuser Micro

TEMPE, Ariz. — Microage has announced the availability of an 8-page catalog on the Alpha Micro multiuser time-shared microcomputer system.

The brochure and a newsletter are available from Microage at 803 N. Scottsdale Road, Tempe, Ariz. 85281.

Analog Devices I/O Boards Fit Pro-Log Microcomputers

NORWOOD, Mass. — A 16-channel data acquisition board available in 8- or 12-bit resolution and a 4-channel analog output board that reportedly is functionally, electrically and mechanically compatible with Pro-Log Corp's 4- and 8-bit microcomputers are available from Analog Devices.

The RTI-1220 data acquisition and RTI-1221 analog output boards provide analog signal handling capability for users of Pro-Log or other 8080- or 6800-based microcomputers in process control laboratory or other environements where real-time data is being acquired, processed and used, according to a spokesman.

Up to 16 Channels

The RTI-1220 board accepts up to 16 single-ended or eight differential channels of analog input signals and is protected against input voltages of up to plus or minus 35V (power on) or plus or minus 20V (power off). Available with 8- or 12-bit analog-digital converters, the unit includes a sample-and-hold amplifier that allows the user to sample signal slewing. Four of the input channels have provisions for resistors to allow four 20mA current loops to be sampled, a particularly useful feature for industrial control applications, he said.

The RTI-1221 analog output board provides four channels of 10-bit resolution output for controlling mechanical devices, supplying signals to recorders or other analog functions. It is a complete analog subsystem consisting of double buffered registers; four 10-bit resolution, full 4-quadrant multiplying digital/analog converters; output amplifiers and two precision references for optional on-board or external use, he said.

These units are available from stock and the RTI-1220 8-bit version costs $269 while the 12-bit version costs $330. The RTI-1221 8-bit version costs $235 and the 10-bit version costs $275 from Analog Devices at P.O. Box 280, Route 1 Industrial Park, Norwood, Mass. 02062.

Cassette Transport Has Capstan Drive

OKLAHOMA CITY, Okla. — A fixed-speed electronic cassette tape transport with an (AC) capstan motor is being offered by Triple I, Inc. It features remote control capabilities, fast start/stop, less than 30-sec. rewind and speeds from 1- to 10 in./sec, the firm said.

The Phi-Deck transport, which has four separate motors that control take-up, rewind, play or record, and head engagement, reduces fluctuations to a minimum because the capstan-drive motor has only one job — moving the capstan, a spokesman said.

The unit, which has applications in microprocessors, programming, industrial controls, testing apparatus and other general applications, is priced at $149 from Triple I, Inc., 4605 N. Stiles, P.O. Box 18209, Oklahoma City, Okla. 73118.

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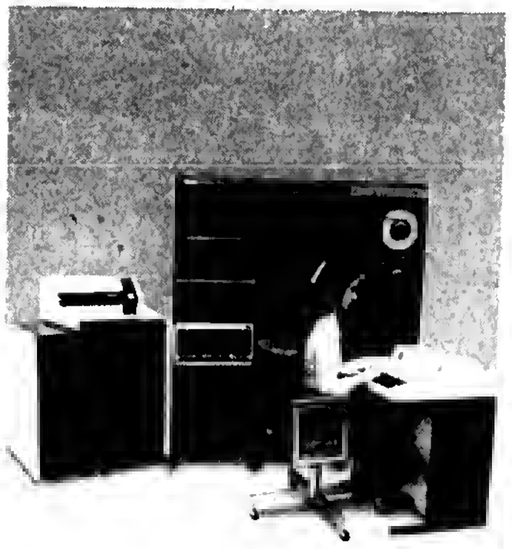

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Before October 17, the basic system included a PDP-11/70 CPU with 256 kilobytes ECC MOS memory, an 88 megabyte RP04 disk pack with controls, a TE-16 1,600 bpi mag tape and controls, and the RSTS/E timesharing operating system. Packaged price: $137,600. Sixteen VT52 video terminals at $2,200 each made the total price $172,800.

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Digital has a new RM03 disk pack with 67 megabytes. Digital has reduced the prices of its terminals. And it has a new packaged system configuration for more savings!

The basic system now includes the same PDP-11/70 CPU with the same 256 kilobytes ECC MOS memory. The same TE-16 mag tape and controls. The same RSTS/E operating system. But it also includes the slightly smaller RM03 disk pack. Packaged price: $103,300. Four VT-52 "four-packs" sell for $6,000 each. Total price: $127,300.

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BUSINESS ACCOUNTING SOFTWARE WANTED for Microdata Reality Computer. Source code must be available in BASIC. Send sample documentation and prices immediately to Jerry Snively, 5329 Main St., Downers Grove, ILL. 60515.

Gigantic Microcomputing Catalog provides information - Microcomputers, books, economical used peripherals, $1.00. COMPUTER WAREHOUSE, Dept. CW, 584 Commonwealth Ave., Boston, MA 02215.

IBM 088-2 Collator. Would make good on line card reader. 650 CPM. $500.00 Y-COMP, Box 9, Windsor, CT. 06095. (203) 888-5206.

Stand-Alone Micro

Board Works With F8 Unit

SAN JOSE, Calif. — A microcomputer board for use with its F8-based systems has been introduced by the Fairchild Camera and Instrument Corp.

Called the OCM/1, the one-card microcomputer can be used as a stand-alone board for low-volume production, for real-time emulation of pilot production and field testing or as a development system using a teletypewriter and/or keyboard display, according to a spokesman.

The OCM/1 consists of four major sections: the processor; a memory section reportedly capable of using four different types of memory; the I/O portion, which consists of a 3850 CPU and a 3851 program storage unit; and the interrupt.

Three Voltages

The board requires three power supply voltages: +12V at 0.255A, +5V at .4A and -5V at 0.09A. The board measures 7.5- by 10.5 in.

The price of the unit is $295. Fairchild is at 1725 Technology Drive, San Jose, Calif. 95110.

Floppy System Fits Cosmac II

SOMERVILLE, N.J. — RCA has introduced a mass memory storage unit designed for use with the Cosmac II development system.

The Floppy Disk System II can assemble a 1000-byte program in 10 minutes compared with approximately one hour for 10 char./sec paper tape systems, a spokesman claimed.

The system includes a dual-disk drive mechanism, interfacing hardware, software for loading programs from the disk into memory, resident editor, assembler and utility programs.

Available in both the domestic and the overseas versions, the system is priced at $3,320 from RCA's Solid-State Division, Box 3200, Somerville, N.J. 08876.

PCM Modules Gives Serial Port Links

SALINE, Mich. — Process Computer Systems, Inc. (PCS) has designed a microcomputer module to interface modems, computer peripherals and other computers to the PCS series of microcomputers.

The Model 1860 board has four, asynchronous, trifunctional serial ports that are user-selective with transmission rates from 110- to 9,600 bit/sec.

Up to 32 satellite microcomputer systems can be interfaced to a host microcomputer and they can be located up to 1,000 ft away, according to a spokesman.

The module costs $595 from PCS at 750 N. Maple Road, Saline, Michigan 48176.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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ALU architecture — A microprocessor can constitute the ALU (Arithmetic-Logic Unit) and control portions of a general-purpose computer. However, because of the different objectives of each manufacturer, architectures vary widely. For example, one major system has only two 8-bit programmer-accessible data registers in the CPU, while another processor has an 8-bit accumulator and 64 8-bit data registers. Generally, the ALU handles 8-bit quantities through the accumulator, and the register file is composed of three 16-bit registers. Because the accumulator and ALU are often only 8-bits wide, these three general registers can be accessed by instructions that treat them as six 8-bit registers. The choice of concept is often up to the programmer. From a hardware standpoint, the processor on many systems operates on 8-bit bytes and all I/O operations use an 8-bit data path.

analog computer — A computer which operates on the principle of creating a physical (usually electrical) analogy of a mathematical problem to be solved. Variables such as temperature or flow are represented by the magnitude of a physical phenomenon such as voltage or current. These variables are manipulated by the computer in accordance with mathematical formulas "analoged" on it.

Ansi (American National Standards Institute) — formerly ASA and USASI, an organization that develops and publishes industry standards.

APL language — a programming language developed by Iverson. An unusually extensive set of operators and data structures is used to implement what is considered by many to be the most flexible, powerful and concise algorithmic/procedural language in existence. Primarily used from conversational terminals, its applicability to "production" job processing is limited, but its value for educational and investigative work is great.

application package — A set of computer programs and/or subroutines used to solve problems in a particular application, i.e., business, scientific, financial, etc.

Ascii — A contraction for "American Standard Code for Information Interchange." This standard defines the codes for a character set to be used for information interchange between equipments of different manufacturers.

assembler — The essential capability of an assembler is to translate symbolically represented instructions into their binary equivalents. A well-designed computer is reflected in a versatile, efficient assembly language instruction set. It is a computer program which operates on symbolic input data to produce from such data machine instructions by carrying out such functions as translating symbolic operation codes into computer operating instructions, assigning locations in storage for successive instructions or computing absolute addresses from symbolic notation.

LEARNER'S LEXICON

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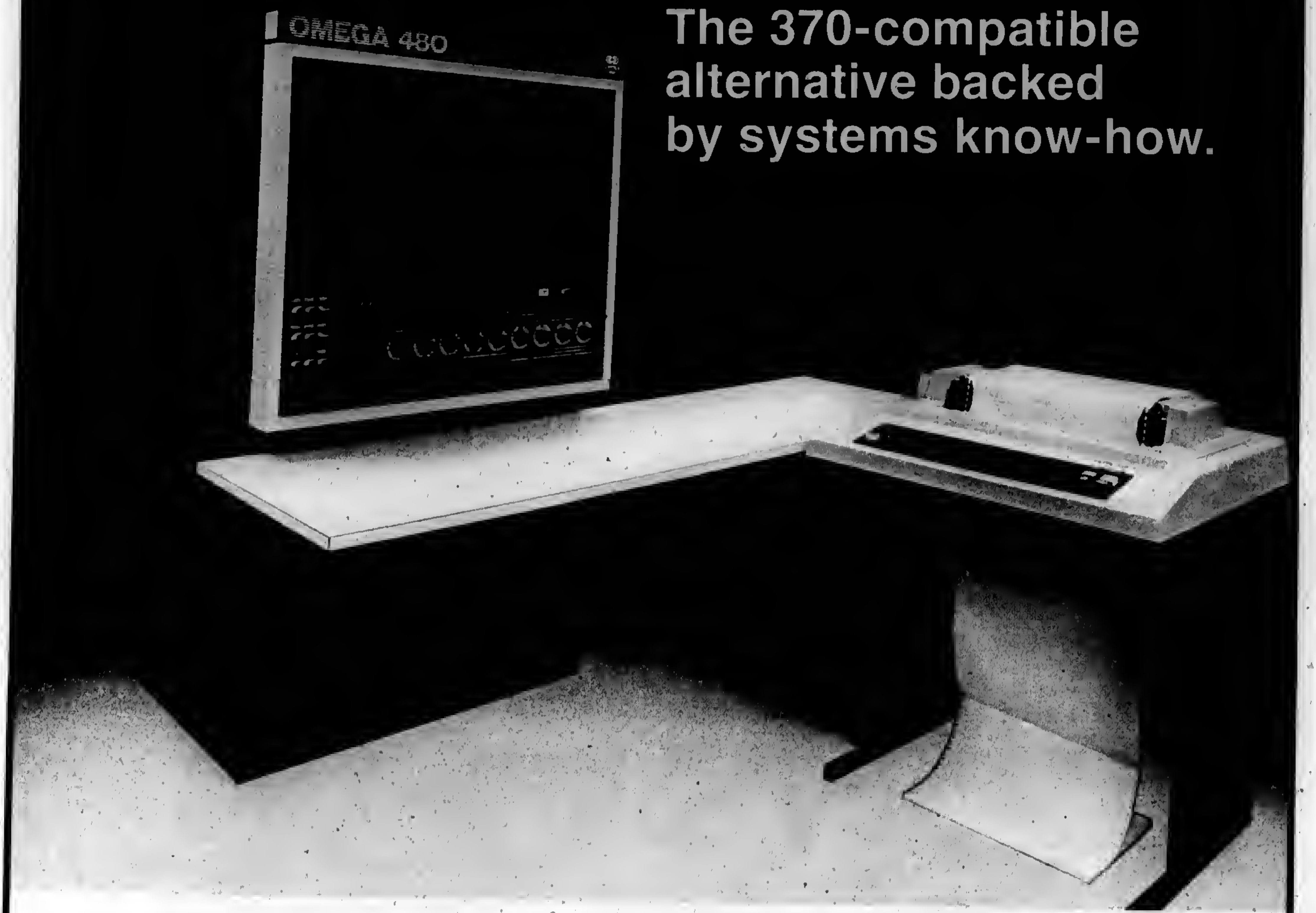

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Reaction to 3031, 3032

Lessors Feel 370s Will Be Competitive

By Molly Upton
CW Staff

The impact on lessors of IBM's 3031 and 3032 announcement is impossible to generalize since it varies according to the type of lease, lessors contacted by *Computerworld* agreed.

Most lessors felt relatively secure since their equipment is out on long-term leases and they had promptly started writing down the cost of the machines after acquiring them.

Many indicated the announcement itself contained no new surprises, and since there are no significant changes in technology, the ball game is being played according to the rules of price/performance, rules under which the lessors feel they can be competitive with their 370s.

In addition, the lower prices for the 148, 158 and 168 that will occur as a result of the new 30 machines are in line with what had been anticipated for 370s which have been on the market from two to five years, they said.

Another factor mentioned by many is that some companies have guaranteed the residual dollars of individual lessors' 370s.

Under this guarantee, the insurers will provide the difference between the original purchase price of the machine and the balance due to any lender when the machine comes off rent, an industry spokesman said.

The policies are pegged to the amount of dollars left unpaid on the loan guaranteed by the insurers, he added, explaining that the market value of the machines is irrelevant as long as the lessor is not forced to liquidate his inventory.

For this guarantee, lessors pay a premium, and in turn agree to be responsible for remarketing of machines, he said.

Lloyds of London recently notified lessors it is not writing any new paper on 370s until it has examined the implications of the new series of announcements and has asked lessors for their views [CW, Oct. 24].

Tom Murphy, president of Itel Leasing, had no comment on the impact of the new machines on Itel's base.

At least two lessors pointed out that the groundrules in the leasing business are changing; that IBM is introducing products at a more rapid pace.

However, they disagreed as to the feasibility of acquiring the newer systems for their portfolios.

A spokesman for Alanthus Corp. observed, "I believe there is a hell of a lot more risk than people see since the groundrules are changing." IBM is introducing machines

(Continued on Page 52)

U.S. Users Spent $38.4 Billion In '76, Afips Study Indicates

By Edith Holmes
CW Staff

WASHINGTON, D.C. — U.S. computer users spent $38.4 billion on DP equipment and services in 1976, the American Federation of Information Processing Societies (Afips) estimated in a report made public here.

These users, who are primarily institutions in business, government and education, expended $20 billion of this total on computer goods and services, $10 billion on salaries and $8.4 billion on overhead, according to the study entitled "Information Processing in the United States: A Quantitative Summary."

While the insurance and banking industries boast the greatest number of firms using computer equipment or services, the manufacturing sector is "by far the largest user in the U.S. in terms of of total expenditures on computer equipment and services," the report stated.

Including 34 figures and tables, the Afips study provides the results of in-depth research into data covering U.S. computer users and suppliers, personnel and education in the information processing field and trends for computing in this country.

Afips drew on the numbers and knowledge of International Data Corp., Auerbach Associates, Inc., the U.S. Department of Labor's Bureau of Labor Statistics, Arthur D. Little, Inc., the U.S. Department of Commerce's Domestic and International Business Administration and its National Bureau of Standards.

Sector Breakdown

The manufacturing sector of the U.S. economy spent 34% of the total monies devoted to computer usage by nongovernment users in 1974. The banking, insurance and other financial industries came in second, accounting for 22% of this total.

In 1975, manufacturing employed 25% of all the general-purpose computer systems installed in the U.S. and 35% of all the

(Continued on Page 53)

At German Show

Users, Exhibitors Think Small

By E. Drake Lundell Jr.
CW Staff

MUNICH — Small business computers designed for stand-alone applications clearly dominated the exhibit floor at Systems 77 here, but distributed data processing was the key phrase in sessions.

Almost 25,000 users attended the show, one of the few European congresses devoted exclusively to data processing.

While technicians debated the "risks and chances" of the distributed concept — and heard the Citibank story — the minds of the buyers in the exhibition halls were clearly on lesser things. The largest mainframe in the five huge halls housing the exhibit was a Univac 90/25 — the smallest Univac machine now available in Germany. And a Univac spokesman said the firm would have brought a smaller system if any were marketed here. However, the firm did show some Varian minicomputers in another booth — Univac having recently acquired that firm.

CW at Systems 77

The small business nature of the show was further marked by the absence of Siemens,

(Continued on Page 61)

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Price Drop Expected

BOSTON — Prices of 370s will continue to decline, according to Sonny Monosson, president of American Used Computer Corp., but he said he could not estimate to what degree.

Deliveries of the IBM 3031 and 3032 will probably start in volume in March, in which case prices of 148s and 158s could drop fairly rapidly, he predicted.

With anticipated early volume deliveries, the situation is unlike that with the 3033, whose unavailability has kept 168-3 prices relatively high, he said.

Monosson commented that the anticipated price drop will be good for used computer dealers, as long as they don't currently have these machines in inventory. A lower price makes a machine more sellable, he indicated.

At a Standstill

Like the lessors, Monosson said business has come almost to a standstill while users evaluate their options.

Monosson suspects the reason IBM did not lower the prices on its 148 as it did the 158 and 168 when it announced the 3033 is that proportionately more of its 148 base is purchased.

With a large purchased base, it faces less exposure to loss of rental income that might come from 148 users who decide to move to 3031s and 3032s, he said.

370s Will Be Competitive With 30 Series: Lessors

(Continued from Page 51)

more often, and the newer units have unprecedented price/performance ratios, which leaves others, such as lessors, with a very weak umbrella, he said.

Although some lessors, such as Thomas McArdle, president of the Computer Lessors Association, termed the new systems "good leasing machines" since they offer relatively low purchase/lease ratios compared with some 370s, the Alanthus spokesman pointed out that historically a low purchase/lease ratio indicates the manufacturer does not expect that machine to have a long life.

It's ironic because if IBM makes a machine that's good for lessors to handle, this generally means IBM plans to sell a lot of them rather than handle them on its own lease and rental plans, he continued.

With a large percentage of an installed base sold, IBM lessens its exposure to revenue erosion that its future product announcements could cause, he said.

Also, he added, when one computes the additional cost factors inherent in the leasing business, such as maintenance and interest, and the necessary discount below IBM's price, the purchase/lease ratio can stretch from three years to six, he indicated.

The 38-month figure, cited by some for a 3031, is "a fallacy that bears no relation to reality," the Alanthus observer said.

Impact Reduced

Many lessors indicated the maturity of the industry has helped the impact of the IBM announcement on the book values of their inventories.

The leasing business is accounting for its 370s differently from the way it did for 360s, and most have the 370s discounted to a small percent so the impact of new, lower priced machines is not as severe as it would have been back in the days of the 360, according to Jerome Naftol, chief operating officer of DPF's computer division. In those days, lessors carried their inventory at relatively high valuations for a longer period of time, he explained.

McArdle agreed, saying more sophisticated thinking went into acquiring 370s than went into 360s.

Naftol said he is still evaluating the IBM announcement.

McArdle indicated he doesn't see any major impact on the book value of the 370/138 and 148.

But the Alanthus spokesman disagreed. Looking to the future, he said there is logically a 20% to 25% cut that should be coming from IBM on the 138 and 148s. The price of a 148 is standing out like a "sore thumb," he continued.

The industry will probably stay away from 138s and 148s on risk leases since there is probably another machine in the wings, such as a 3030, he remarked.

Pat Baker, national sales manager of Comdisco, Inc., indicated there are probably a lot of 148 users who have recently acquired the machine and are rethinking their transaction.

Baker said the announcement has left Comdisco unscathed since it writes primarily straight operating leases over three- and five-year terms. Most of its portfolio is in 145s, 155s and 165s, he added.

Alanthus is not terribly affected by the recent IBM products and price cuts, the spokesman for that firm said, since most of its larger systems are on longer term leases.

The leasing business should come to a standstill for the next six to nine months, he indicated, since 158 and 168 customers are evaluating their options and there are no new machines to offer until delivery begins.

But he predicted 158s should be strong through next year — until quantity deliveries of the new systems start — and then the trouble begins.

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Basic/Four Systems are also marketed in more than 30 foreign countries.

'76 DP Spending Topped $38 Billion: Afips

(Continued from Page 51)

minicomputers, according to the Afips report.

The Federation of Professinal Computer Societies suggested that manufacturing's dominance in this area is likely to continue since this sector of the economy heavily uses minis and dedicated application computer systems to control both continuous processes and discrete devices. These computer control applications "may be the fastest growing area in the future," Afips said.

While the federal government is the largest single user of computers, accounting for approximately 6% of total usage in the U.S., federal usage is not increasing as fast as that of the U.S. at large, the report said.

The total number of computers owned or leased by the federal government has grown, however — from 5,900 in 1971 to 9,600 in 1976. The Department of Defense accounts for almost half — 45.9% — of federal computer usage, the study said.

The future promises that individual users will soon join the ranks of institutional and big government users, Afips predicted. Developments in microprocessors and digital telecommunications "foretell a future in which 'personal' computing is a widespread reality," the report stated.

Computing on an individual basis may be further facilitated by course offerings designed to increase the degree of 'computer literacy' in the U.S. Beyond courses offered in programs leading to computer-related degrees, "a significant and growing number of computer-related courses" at both the college and high school levels is helping to familiarize the average person with computing, Afips suggested.

The total computer labor force, consisting of such traditional computer-related occupations as programmer, systems analyst, maintenance technician and keypunch operator, numbered 853,000 in the U.S. in 1974, Afips said.

However, this total does not include "a substantial and growing number of individuals whose primary occupation is not in the computer field but who use remote terminals," the report noted. These people — airline reservation or department store clerks and bank tellers, for example — "are now performing functions previously performed by individuals trained in computer-related occupations," Afips concluded.

One indication that the number of such individuals is growing dramatically is that the number of general- and special-purpose terminals in the U.S. was put at 1.2 million in 1976. By 1980, the number of terminals in this country is expected to be 3 million, Afips said.

Of the total 1974 computer labor force of 853,000, 111,000 were employed in the computer manufacturing and service industries and 742,000 were working for institutional computer users.

Looking at the computer labor force from one additional perspective, the National Science Foundation said that "computer specialists" account for 6% of all scientists and engineers in the U.S.

In its research into computer suppliers, Afips found that the computer manufacturing and services industries have grown steadily since 1971. Their estimated revenues have doubled approximately in the five-year period ending 1976 and are forecast to double again in the five-year period ending in 1981.

World revenues for U.S. computer manufacturing firms were $26.6 billion at the end of 1976 and are expected to be $51 billion by the end of 1981. U.S. computer service firm revenues were $5.3 billion at year-end 1976 and are projected to be $13 billion by 1981.

Afips expects the value of shipments of computer equipment to double between now and 1981. Total shipments were valued at $7.8 billion in 1971, $15.9 billion in 1976 and are forecast at $30.5 billion in 1981.

"U.S. firms participate heavily in the world market, deriving approximately 50% of their revenues from overseas sales," the Afips study said, adding that U.S. computer equipment manufacturers dominate the world market, accounting for 87% of the world's computers by value."

Afips warned, however, that the U.S. share of the world market is decreasing as a result of competition from foreign manufacturers. Japan leads this competition, and the U.S. share of the world market is expected to dip to 81% by 1981.

At the same time, the U.S. will continue to enjoy trade surplus in the computer field, the study said.

The report can be obtained for $6.00 from Afips press, 210 Summit Ave., Montvale, N.J. 07645.

Honeywell Buys Incoterm

MINNEAPOLIS — Honeywell, Inc. has agreed to purchase Incoterm Corp. for between $35 million and $44 million. Incoterm will operate as a division, retaining its current top management.

The transaction, slated to occur in early 1978, is subject to approval by a majority of holders of Incoterm A and B class stock voting together and of the preferred stock, as well as to certain other conditions, the firms said.

The agreement calls for Honeywell to convert each Incoterm share, on a common stock equivalent basis, to .42 shares of Honeywell common.

GILE IS HERE

First Agile A1 Sighting Reported

[illegible] throngs fill streets

Excitement swept the populace recently as word of the first sighting of the Agile A1 daisy-wheel terminal was flashed throughout the metropolis. The A1, reported to be the first in a long line of microprocessor-based terminals to be offered by Agile, arrived from the firm's large new manufacturing facilities in Sunnyvale, California. A large production run for inventory was said to account for the immediate delivery of the terminal.

Early dispatches reported that every A1 terminal undergoes long burn-in at high temperature to assure purchasers of reliability. Inspection of the unit by your trustworthy reporter (which was hampered by the capering multitudes) disclosed that the A1 features a Selectric-style keyboard with illuminated function lights.

Rumors that the huzzahs of the [illegible] caused a horse to bolt on [illegible] Street were found not to be

Fiendishly Clever Plot Revealed

[illegible] to speed data plotting [illegible] science and business has [illegible] to light with the un[illegible] the Agile Plot Support [illegible] to [illegible]

Correspondent reports

26 Agile Service Centers Announced

A network of 26 service centers has been established throughout the Nation to provide care for Agile and GenCom terminals, according to late reports. All centers stock parts for both kinds of terminals, including the **GenCom 300A, 300D,** and **300Q** machines. Centers in the major metropolises are staffed by Agile personnel, while the outlying Territories are served by carefully selected independent companies that are experienced in dealing with the Natives.

In an interview with Mr. R. Bullene, who identified himself as Agile's national service director, your correspondent elicited the following: "It's one thing to have an agreement for national service. It's quite another to have the necessary support in place. We're ready to provide service almost anywhere in the country."

Mr. Bullene solicited direct inquiries via the new electric telephone system at (408) 735-9904.

Variety of lease plans available for Agile A1

Attractive one-year operating leases

Longer-term, high equity plans also offered

(Story on page 6, col. 3)

Exclusive!

Agile Optional Features Revealed

This chronicle has obtained a compendium of the optional features available with the Agile A1 terminal:

◇ Justification mode, which allows the terminal to produce perfectly justified text. Variations in the 1/120-inch inter-word and inter-character spacing result in output of nearly photo-composition quality.

◇ A transparency feature allows the printing of all 128 ASCII characters to make debugging and error locating easy.

◇ Data compression allows the user to drive a 55-cps mechanism with a 300-baud line.

◇ The print enhancement option features automatic overstrike and underscore to produce bold, enhanced printing at high speeds.

◇ Hardware options include special keyboard configurations, 45- and 55-cps mechanisms, and custom microcode features.

Details of Agile's options are too voluminous for this brief treatise, but may be had through contact with the manufacturer.

Immediate Delivery!!!

Agile promises shipment on receipt of order.

(Story on page 2, col. 4)

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Agile A1 will appear at the Interface West Show November 1, 2 and 3.

NCR is out to put the world of business on a new computer series called the I-8100.

Low price plus instantaneous entry, reporting and data base updating provide the most cost-efficient man/machine interaction in the industry.

The NCR I-8100 Series is exciting news for those who thought computers were too expensive and complex for their operations. And for those who have or are moving into a distributed processing network.

Everything about the interactive 8100 Series (I-8130 and I-8150) reflects simplicity. It's small, about the size of an office desk. It requires no special environment. It's preprogrammed for easy operation—in fact, any office employee can handle the most sophisticated data processing transaction.

Preprogramming also means your system starts paying off as soon as it's unboxed. Operating instructions appear automatically on the video display terminal to lead your operator through every transaction. Whether the application is budgetary accounting, revenue and expenditure, or payroll,

your organization enjoys the profitable benefits of computer-assisted management from the word go!

Now is the time to learn how a computer series called the I-8100 can focus the power of automation on the big problems of business. Contact the NCR office in your area. Or write to 8100 Marketing Systems, NCR Corporation, Box 606, Dayton 45479.

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Complete Computer Systems

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CI Notes

Microdata Agrees To Buy CMC UK

IRVINE, Calif. - Microdata Corp. has agreed to purchase Computer Machiner Corp. (CMC)/UK and is negotiating an agreement with the other CMC/Europe companies under which they will distribute Microdata products, according to Microdata President Donald W. Fuller.

The definite agreement calls for Microdata to purchase 75% of common stock of CMC/UK for about $4 million in cash and notes.

Microdata had originally planned to acquire all of the CMC companies in Europe. CMC/UK had previously been a distributor for CMC products and will be an autonomous subsidiary of Microdata, Fuller said.

Xerox Buys 4.5% Of Threshold

DELRAN, N.J. — Xerox Corp. has purchased into Threshold Technology, Inc., here, picking up 62,500 previously unissued shares of common stock.

The purchase, made at $8 per share, represents an investment of $500,000 by Xerox, which now owns 4.5% of the total number of Threshold shares.

The agreement also granted Xerox an option to buy 62,500 Threshold shares on the same terms in one year. Xerox will have to exercise the option if Threshold achieves a net profit of $275,000 during the current fiscal year and if it meets certain other conditions, according to the agreement.

BR, Diebold Ink Pact

CANTON, Ohio — Bunker Ramo Corp. (BR) and Diebold, Inc. have agreed to jointly market their terminal and communications product lines to the banking industry.

The agreement, reached after eight months of negotiations, allows each firm to continue to market their product lines individually. Under the agreement, however, they can together offer banks control units to handle both the Diebold automated teller machines and cash dispensers as well as BR's point-of-sale and teller terminals.

IBM Building in Tucson

TUSCON, Ariz. — IBM will construct a manufacturing plant and deveopment laboratory near here.

The operation, located on a company-owned site 11 miles out of town, will be run by the General Products Division. Over the next two years, the facility is expected to grow to an employment level of 1,000 and will have 500,000 square feet of space.

The facility will be responsible for magnetic tape drives and library storage devices made by the firm.

TI Gets Big Order

HOUSTON — Texas Instruments, Inc. has received a multimillion-dollar contract from Reynolds & Reynolds for over 2,000 Silent 700 terminals to be used in inventory management and accounting systems for automotive dealerships.

Supershorts

Telenet plans to issue 625,000 shares of common stock at an offering price of $16 to $20 per share. L.F. Rothschild, Unterberg, Towbin of New York will handle this first public offering of Telenet stock.

Four-Phase Systems has placed $20 million worth of senior notes privately.

Pertec Computer Corp. has filed for listing on the New York Stock Exchange. The firm is presently listed on the American Stock Exchange.

The Digitronics Division of Comtec Information Systems, Inc. in Cumberland, R.I., has acquired the manufacturing and marketing rights to the paper tape punch line developed by Precision Mechanisms Corp.

Altel Data, a unit of Alberta Government Telephones in Canada, will market Sycor, Inc.'s terminal equipment throughout the province of Alberta.

Centronics Data Computer Corp. has established a subsidiary in Italy with headquarters in Milan. It is known as Centronics Data Computer (Italia) SpA. The outfit will handle OEM sales and support; end-user marketing will be undertaken by Eurotech Italia SpA.

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When something as good as the Teletype model 43 teleprinter comes along, it naturally generates a lot of talk. And for a lot of good reasons.

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Another convenient cost-saving feature of the model 43 is that it's designed to use 12" wide by 8½" long fanfold paper. Tear off the serrated margins and you've got a 132-character line on the handy 11" x 8½" paper.

When you add up all the model 43's features, you'll think there's been a mistake when you see the low price. But it's true. Because on a price/performance basis, the model 43 is simply unsurpassed.

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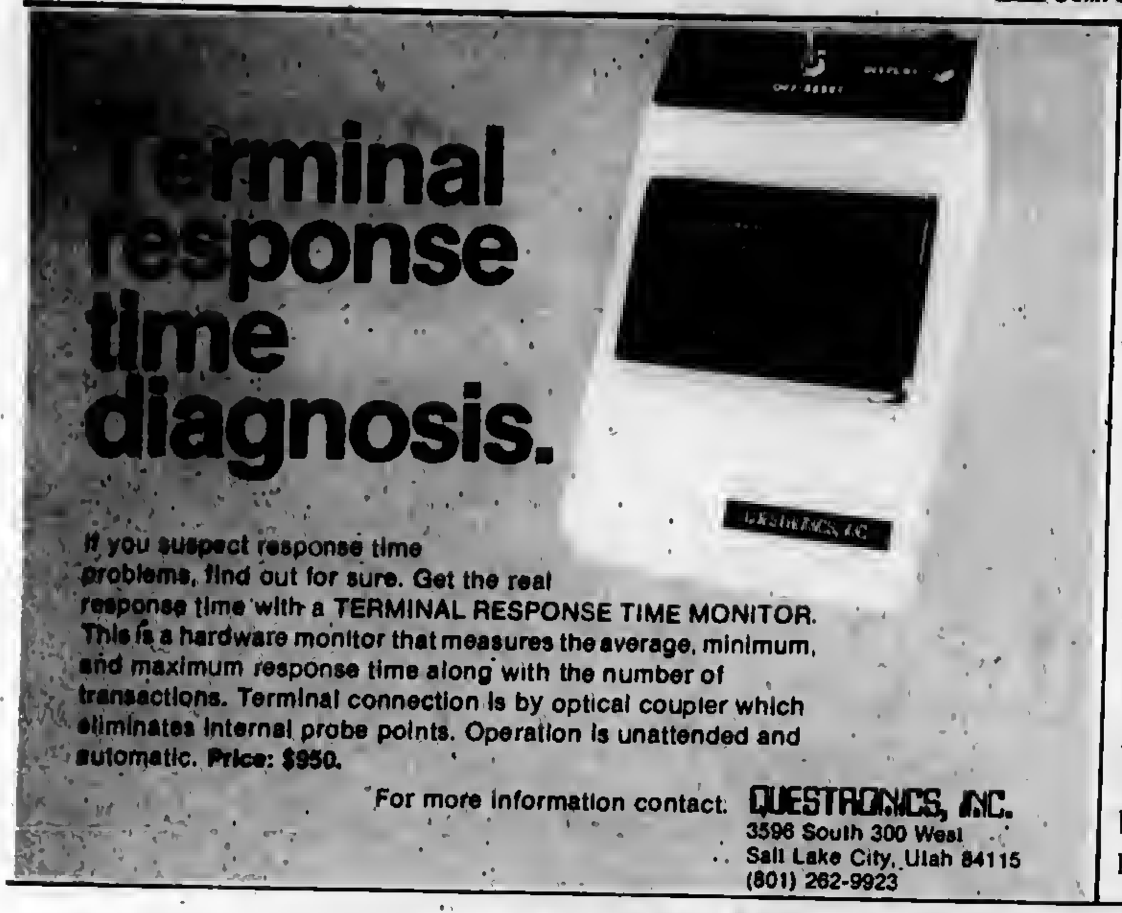

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Wang Introductions Launch Firm Into Supermini Arena

By Esther Surden
CW Staff

NEW YORK — With the introduction of the 2200VS CPU and the WCS/60 and WCS/80 systems by Wang Laboratories, Inc. here recently [CW, Oct. 17], the firm, which previously concentrated on small systems for first-time users, took a step into a market replete with users who have sophisticated processing needs.

The 32-bit virtual memory systems had been under development at Wang for four years, according to Dr. An Wang, president of the company.

What is clear is that Wang sees itself becoming a one-billion-dollar company within the next decade. According to John Cunningham, senior vice-president for sales, achieving that goal will be a matter of course since profits are up 29% from the year 1973 to 1977 and are expected to continue steadily.

"Our hardware product expansion has been both disciplined and ambitious," Cunningham said.

Novices and Experts

CW Photo by E. Surden

Dr. An Wang

The 2200VS-based systems, according to Ned Chang, senior vice-president for marketing, are aimed at the supermini marketplace made up of distributed processing users and first-time users. Distributed processing users have five key requirements, he said. These include the need for systems with incremental growth paths, interactive processing, a large disk storage capacity, industry standard protocols and languages and "broad industry compatibility."

Novice users, on the other hand, need a system that is easy to manage, has industry application software, provides incremental growth, comes from a vendor with established systems support capabilities and is aggressively priced. The WCS/60 and WCS/80 fill these requirements, Chang asserted.

When asked about competition for the system, Chang compared it to the Digital Equipment Corp. PDP-11/70 and the IBM 34. The 34 has less memory available, and a smaller amount of disk storage can be attached, he said.

As for the PDP-11/70, "I don't see that there is any comparison," he said. "It's a more expensive machine that is somewhat faster" than the Wang system but "when price comes into consideration," the Wang will fill more users' needs. Another spokesman said that the system would more accurately compete with the Prime Computer, Inc. 300 system.

We've made a single sale worth $150,000 right on the exhibit floor. We couldn't be more pleased with the Computer Expo.

Wil Little
Vice President of Marketing
Informer, Inc.

All of us at Genesis One are very pleased with the quality and quantity of the prospects at the Computer Expo. We gain many additional customers from the new contacts we make at each of the shows.

George W. Saupe, Jr.
Regional Sales Manager
Genesis One Computer Corp.

We've been to several national shows, but I feel the Computer Expo is the best show we've exhibited in; I like the regional approach. We're looking for leads and we're finding them. There's no question that we'll be back again next year.

J. Patrick McKeon
Regional Sales Manager
Graphic Controls Corporation

A user who hadn't even considered acquiring our equipment visited our booth and within a week placed an order. This is typical of the success we've had at each of the Computer Expos.

Fred Zirkle
President
Key Tronic

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☐ Mid-Atlantic Computer Expo	New York	May 9-11
☐ Great Lakes Computer Expo	Detroit	May 23-25
☐ New England Computer Expo	Boston	May 30-June 1

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Executive Corner

- James Simpson has been named vice-president and general manager of Computer Media Group, Memorex Corp.
- Saul B. Dinman has been elected president, treasurer and chief executive officer of GRI Computer Corp.
- Ronald C. Dodson has been appointed vice-president, finance and administration, of Computer Network Corp.
- Gail A. Franke has been promoted to vice-president marketing, of the Computer Network Corp.
- Richard T. May has been appointed vice-president of operations at Computer Network Corp.
- David Martin has been named vice-president and general manager of computer products at National Semiconductor Corp.
- F. Joseph Van Poppelen has been named vice-president of semiconductor marketing at National Semiconductor Corp.
- John Finch has been named vice-president and general manager of semiconductor components at National Semiconductor Corp.
- Phillip A. Rice has been appointed to the post of vice-president of human resources for Basic/Four Corp., an MAI company.
- Valere De Smet has been appointed vice-president of international operations of Decision Data.
- E. Joseph Simmons Jr. has been named vice-president of marketing at Threshold Technology.
- George Kostecki has been named vice-president, midwestern region, of Data Processing Security, Inc. (DPS).
- Ryan P. Schmelz has been elected to the position of vice-president and general counsel to Remote Computing Corp.
- H. Glen Neff has joined Bowne Time Sharing, Inc. as vice-president of marketing.
- James S. Campbell has been appointed president of Xerox Corp.'s Business Systems operating unit in El Segundo, Calif.
- Albert M. Kritz has been appointed to the post of vice-president, engineering, at Computer Transceiver Systems, Inc. (OTC).
- W.H.J. Selders has joined TEC, Inc. as vice-president, finance, and chief financial officer.
- Gary R. Alexander has been named a vice-president by logical Design Corp.
- George Roberts has been named vice-president and general manager of computer products at National Semiconductor Corp.
- Kurt W. Hackel has been named general manager of NCR Germany and Lucien Bardane has been appointed general manager of NCR France.
- Anthony L. Fazio has been named to the new position of vice-president of sales for Sycor, Inc.
- David Westermann was appointed chairman of the board and Sal J. Nuzzo was named president of the Hazeltine Corp.
- Lou Burns has been appointed director of marketing support for Quantor Corp.
- Kenneth R. Bilodeau has been promoted to director of finance and planning by California Microwave, Inc.
- John W. Hemmer has joined the Data Dimensions, Inc. board of directors.
- Frank R. Lautenberg has been elected chairman of the board and chief executive officer of Automatic Data Processing, Inc. Henry Taub assumes the post of chairman of the newly established executive committee while Josh Weston has been elected president and chief operating officer.
- John C. Lobb has been elected chairman of the executive committee of the board of directors of Modular Computer Systems, Inc.
- Thomas R. Taylor has been promoted to vice-president in charge of product marketing at Storage Technology Corp.
- Dharam V. Ahuja has been named director of product marketing of the large systems operation of National Semiconductor's Computer Products Group.

Orders & Installations

Texarkana National Bank has ordered a Financial Control System from University Computing Co. (UCC). This system will be used in its general ledger applications.

Griffin Computer Services, a wholly owned subsidiary of Security New York State Corp. of Rochester, N.Y., will install this fall a Honeywell Page Printing System (PPS) valued at $178,000.

The City of Seattle has installed a Univac 90/80 system valued at $3 million.

Sargent & Lundy, Chicago, has ordered a Univac 1100/81 system.

The Chase Manhattan Bank has ordered a Watsbox telephone management system from Action Communication Systems, Inc.

Jewel Food Stores of Chicago has ordered Datachecker electronic point-of-sale checkout systems from National Semiconductor Corp. valued at $3.5 million.

Raybestos-Manhattan, Inc. of Blue Bell, Pa., has ordered a Univac 1100/22 system, valued at about $3 million for its corporate headquarters in Trumbull, Conn.

Hospital Data Center of Virginia, a shared hospital computer center headquartered in Norfolk, Va., has installed a Honeywell Model 66/10 computer system and a high-speed Page Printing System valued at $1.7 million.

Lake-to-Lake Dairy Cooperative of Sheboygan, Wis., has ordered an XL40 distributed keyprocessing system from CMC, a division of Pertec Computer Corp.

Quality Farm & Fleet of Muskegon, Mich. has installed a Honeywell Model 66/10 computer system valued at $1.3 million.

The Atlantic Richfield Co. (Arco) has ordered three Trace systems, valued at about $2.9 million, to be used for processing credit card invoices from Recognition Equipment, Inc. (REI).

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Earnings Reports

CARTERFONE COMMUNICATIONS
Three Months Ended June 30

	1977	a1978
Shr Ernd	$.08	$.06
Revenue	2,927,500	2,403,800
Earnings	160,900	120,400
6 Mo Shr	.14	.30
Revenue	7,765,000	6,903,700
Earnings	265,800	638,400

a-Restated

COMPUTER NETWORK
Three Months Ended June 30

	1977	1676
Shr Ernd	$.26	$.14
Revenue	3,377,000	1,496,000
Earnings	319,000	164,000

COMPUSCAN
Year Ended May 31

	1677	1676
Shr Ernd	$.55	$.91
Revenue	13,706,000	13,090,000
Tax Cred	.....	227,000
Earnings	1,223,000	1,627,000

ANACOMP
Year Ended June 30

	1977	1976
Shr Ernd	$1.09	a$.70
Revenue	16,163,276	12,650,946
Earnings	1,162,236	635,365
3 Mo Shr	.26	e.24
Revenue	5,239,666	3,463,004
Earnings	319,642	266,616

a-Adjusted to reflect 10% stock dividend paid Sept. 1, 1977 on holders of record Aug. 11.

THRESHOLD TECHNOLOGY
Year Ended June 30

	1677	e1976
Revenue	$1,275,404	.....
Loss	524,604	.....

e-Comparable figures unavailable; company changed end of fiscal year from July 31 to June 30.

MEDICAL COMPUTER SYSTEMS
Three Months Ended June 30

	1977	1676
Shr Ernd	$.12	$.10
Revenue	2,577,063	2,277,474
Earnings	323,636	266,341
6 Mo Shr	.23	.19
Revenue	5,116,696	4,467,673
Earnings	633,425	510,976

METRIOATA COMPUTING
Three Months Ended June 30

	1677	1676
Shr Ernd	$.33	$.21
Revenue	2,707,000	2,490,000
Earnings	115,000	66,000
9 Mo Shr	.68	.55
Revenue	5,573,000	5,067,000
Earnings	258,000	216,000

SYSTEMS ENGINEERING LABS
Year Ended June 24

	1977	1976
Shr Ernd	$.55	.....
Revenue	30,774,000	$20,003,000
Earnings	1,546,000	(7,000)
3 Mo Shr	.23	.16
Revenue	9,012,000	6,317,000
Revenue	6,012,000	6,317,000
Earnings	662,000	463,000

TECHNALYSIS
Three Months Ended June 30

	1977	1979
Shr Ernd	$.16	$.06
Revenue	904,520	539,373
Earnings	69,757	32,690
6 Mo Shr	.26	.11
Revenue	1,495,107	1,017,104
Earnings	155,02	91,726

MSI DATA
Three Months Ended June 25

	1977	1676
Shr Ernd	$.40	$.32
Revenue	6,057,739	6,643,176
Earnings	798,214	626,344

COMPUTER TASK GROUP
Six Months Ended June 30

	1977	1679
Revenue	$4,195,000	$2,427,000
Earnings	160,067	70,392

COMSERV
Six Months Ended June 30

	1677	e1676
Shr Ernd	$.14	$(.04)
Revenue	1,466,915	994,250
Earnings	113,277	(36,191)

OPF
Year Ended May 31

	1977	e1676
Shr Ernd	.....	$.51
Revenue	$464,966,000	22,600,000
Earnings	5,631,000	2,234,000
3 Mo Shr	.....	.09
Revenue	113,120,000	5,394,000
Earnings	2,764,000	435,000

a-Restated

HARRIS
Year Ended June 30

	1977	1976
eShr Ernd	$3.12	$2.13
Revenue	646,266,000	513,663,000
Earnings	40,056,000	26,638,000
e3 Mo Shr	.66	.59
Revenue	196,610,000	139,266,000
Earnings	12,487,000	7,495,000

e-Adjusted for 2-for-1 stock split declared in November 1676.

LOGICON
Three Months Ended June 30

	1977	1976
Shr Ernd	$.30	$.26
Revenue	6,979,000	6,781,000
Earnings	271,000	223,000

COMPUTER CONSOLES
Six Months Ended June 30

	1977	1976
Shr Ernd	$.17	$.17
Revenue	6,050,645	4,731,293
Tax Cred	61,500	.....
Earnings	268,036	293,200

COMPUTER INVESTORS GROUP
Three Months Ended June 30

	1977	1976
Shr Ernd	.....	$.11
Revenue	$6,766,000	7,013,000
Earnings	(676,000)	249,000

MATHEMATICA
Year Ended June 30

	1977	1976
Shr Ernd	$.96	$.96
Revenue	22,970,000	16,670,00
Earnings	666,000	970,000
3 Mo Shr	.22	.32
Revenue	6,162,000	5,621,000
Earnings	156,000	223,000

PERTEC COMPUTER
Three Months Ended June 24

	1977	1976
Shr Ernd	$.24	$.16
Revenue	29,049,000	22,734,000
Earnings	1,471,000	851,000

RELIANCE GROUP
Three Months Ended June 30

	1677	1976
Shr Ernd	$2.77	$1.39
Revenue	279,033,000	236,155,000
Earnings	22,961,000	12,006,000
6 Mo Shr	5.06	.92
Revenue	543,520,000	456,095,000
Earnings	42,116,000	10,316,000

SCAN-DATA
Three Months Ended June 30

	1677	1979
Shr Ernd	$(.06)	$.09
Revenue	3,137,001	4,376,906
Earnings	(100,553)	197,906
6 Mo Shr	.13	.10
Revenue	7,419,641	7,666,316
Earnings	223,316	184,434

SCIENTIFIC SOFTWARE
Six Months Ended June 30

	1977	1976
Shr Ernd	$.12	$.23
Revenue	3,364,747	3,195,671
Earnings	149,613	301,197

STERLING COMPUTER SYSTEMS
Three Months Ended June 30

	1677	1976
Shr Ernd	$.04	$.04
Revenue	529,572	543,961
Earnings	25,175	29,697

SYNCOM
Three Months Ended June 30

	1677	e1676
Shr Ernd	$.022	$(.012)
Revenue	1,119,600	868,592
Disc Op	36,275	.....
Earnings	39,774	(20,904)

e-Restated to reflect sale of Business Systems Group.

Take an in-depth look at in-house timesharing:

You know the problems facing the data processing department:

Other departments in your company want faster response, broader capabilities, better service.

And your management wants you to hold down your operating costs.

You're probably looking hard for a solution. A closer look at in-house timesharing could give it to you.

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Unlike upgrading a large central computer, expansion to an in-house timesharing system isn't a time-and-money-consuming ordeal.

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The BTI 4000 Interactive Timesharing System is made by us:

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To help you do more—while helping your company spend less.

Easy to begin, room to grow
You can own your own BTI 4000 for as little as $35,950. For that you get a ready-to-go system with 10 megabytes of storage and 8 ports—just add terminals.

And start-up won't cause a departmental hang-up. The BTI 4000 can be installed and working for you in one working day.

Expanding to do even more work takes even less work. The BTI 4000 features modular construction, so system downtime for expansion is minutes, rather than days. You can add disk storage to 400 megabytes; increase user capacity to 32 ports; add peripherals like industry-compatible magnetic tape and a line printer.

Hard working, always working
The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, all completely independent.

It also gives you continuous system availability, because software housekeeping can be performed while users are on-line.

There's also off-hours job-stream processing. So the BTI 4000 can be working for you, even when no one's around.

The BTI 4000 uses BASIC-X, an unusually powerful extension of the BASIC user language, enhanced for business programming.

What's more, the BTI 4000 offers heirarchal account organization and stringent security so that you can maintain total control over who's using it, and what they can do.

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Used during typical office hours, the operating costs for a BTI 4000, including maintenance, are about $1 per terminal hour. And should you grow to 24 hour usage, your operating costs shrink to less than 10¢ per terminal hour.

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We back our BTI 4000 with any-hour, anywhere, on-line support with dial-up access for problem diagnosis. Yet in a typical installation, our maintenance plan costs less than 1% of the system's purchase price per month.

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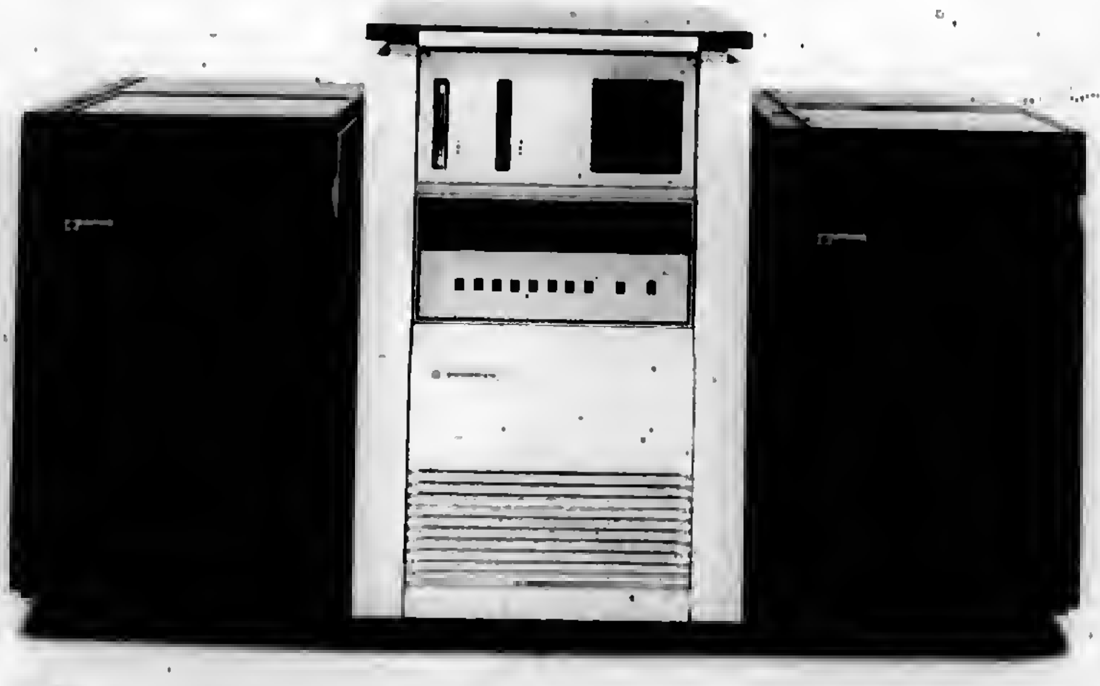
The BTI 4000. The interactive timesharing system that will help your data processing department do more, for less.

For more information, just look to the Basic Timesharing office nearest you.



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Small Systems Make Debut

NEW YORK – At least two exhibitors at the recent Information Management Conference and Exposition here showed their compact versions of small business systems, each of which look like a CRT terminal.

With the "Look Ma, no box" approach, Qantel Corp. placed in a futuristic-looking CRT all the innards necessary to give the user a small business system — including those parts commonly placed in a box underneath the desk.

Qantel System 210

The System 210 contains up to 65K of memory, using 16K chips, and is software-compatible with the rest of the firm's product line; it also features asnchronous communications facilities, a spokesman said.

Hewlett-Packard Co. showed its "Friendly business computer," the System 25, which has a host of function keys arrayed on the keyboard, and looks rather like one of HP's more complex calculators. Again, however, everything sits on top of the desk.

Although one speaker indicated distributed data processing is a concept, not a product, Basic/Four Inc. thought otherwise when it gave its systems the capability to interconnect with larger CPUs via asynchronous communication.

Microdata, Inc. unveiled its upgrade to the Reality system, dubbed the Royale, (see Page 42), and its OEM cohort, the Express system.

For OEMs, Digi-Log Systems, Inc. showed its Microterm II, which it termed an "integrated desktop powerhouse." The unit has a CRT, two minifloppy drives and an integral printer; it can contain up to 80K of random-access memory.

The unit is driven by a Zilog Z80 microprocessor. A second Z80 handles communications, the printer, keyboard, CRT and data manipulation functions, the firm said.

The Microterm II costs $7,000 in single quantities and $6,000 in lots of 100, the firm said from Babylon Road, Horsham, Pa. 19044.

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WANG

Europeans Told To Think Small

(Continued from Page 51)

the only major mainframer not represented. Sources indicated that it did not come only because it does not have a product in the smaller business area.

Many of the names of the almost 470 exhibitors would be familiar to the American audience, led by the likes of IBM, Honeywell and NCR. But all emphasized the lower end of their lines.

IBM only exhibited a System 34 and Series/1 minicomputer — and baldly refused to answer any questions about its larger systems or at least its new 3031 and 3032 processors. While those units received some interest, IBM in Germany has not even announced prices for them at present.

Among less familiar firms, from the American point of view, small systems also dominated.

While most of the companies exhibiting came from Germany — or were German subsidiaries of American firms — the show presented an international flavor with a large block of booths taken by the U.S. consulate here where 68 American firms showed their wares as a group.

With some exceptions, the U.S. contingent offered components, with just a smattering of complete systems and software firms.

The British were also out in force with a block of 20 companies.

Poland, Hungary, Belgium, Canada, Italy, France, Luxembourg, The Netherlands and Switzerland were also represented.

"Sorry, sir, the computer you are calling does not answer... Breeepzzt, click."

Today's data communications network can be tomorrow's hangup. So we're taking a long look at the subject in our November 28th special report, "Data Communications Networks."

Edited by Ron Frank, *Data Communications Networks* will examine the often confusing array of protocols, architectures, equipment and transmission methods available. And, it will help you understand the guidelines to use for configuring or expanding your network, with tutorials and applications stories on how effective networks are designed and maintained. Here's a sampling of the kinds of stories you'll see.

- Selecting the right terminal for the right job in the right network.
- Case histories of successful networks and how they were designed and configured
- An evaluation of IBM's Systems Network Architecture
- The tradeoffs between private line networks and packet networks

If you're involved with data communications, or if you expect to be in the not too distant future, our November 28th special report will help you have what you need to know. And if you market data communications equipment or services, our report is where you should advertise. Ad closing date is November 11. For details, contact your *Computerworld* salesman. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Computer-Link Has Product, Looks for Niche

By Edith Holmes
CW Staff

BURLINGTON, Mass.— Eugene P. Brandeis is looking for a DP industry market niche that is in need of a product with some technical content, that is specialized to a certain degree and that won't be attractive to every other firm in the business.

Brandeis is also president of Computer-Link here.

A little luck and several orders over the next few months for a device Computer-Link recently introduced will prove whether his search is at a temporary end.

The product: a one-step remittance processor, complete with its own user-programmable microcomputer, designed to help businesses cut their bill payment processing costs by between 80% and 90% [CW, Aug. 29].

Computer-Link isn't the first company to discover the market potential for remittance processing — the handling of payment checks and stubs. There are six other manufacturers with products in this area, "unfortunately including IBM and Burroughs," according to Brandeis.

But every machine on the market in this field is different, he contended.

What makes Computer-Link's Sorc/800 different is that it doesn't require a central CPU. It has a built-in Digital Equipment Corp. LSI-11 microcomputer with 32K words of memory.

The price tag on the Sorc/800 is anywhere from $32,000 to $37,000 depending on the type of scanning required. Computer-Link's competitors sell remittance processors for between $26,000 and $27,000, but the user has to buy a $60,000 CPU to go with it, Brandeis maintained.

Brandeis concludes that Computer-Link can more economically service the smaller user — an insurance agency — a small department store, a large stationer — anyone who must process at least 2,000 payments each day — with its remittance processor.

Departure From Tradition

Eight years old and 70 employees strong, Computer-Link is known in the industry for its media maintenance products — cleaning and testing devices for tapes and disks, line counters and reinking machines. The remittance processor thus represents a significant departure from the firm's traditional product line.

"There is no one brilliant technical innovation embodied in Computer-Link's machine," Brandeis said. Sorc/800 "is a systems and procedures solution to a nightmarish problem."

The problem is how to get money received in payment for goods and services to the bank and credited to an account quickly — belongs chiefly to the company receiving the payment check and stub. It can also affect the very end-user — the consumer — who, for example, mails in his check to pay the telephone company but forgets to include the punch card that identifies who he is and what phone bill he is paying.

Accomplished manually, remittance processing takes a lot of time and several clerks; it rarely permits quick crediting of the money to the company's bank account, Brandeis noted.

In the Computer-Link device, a conveyor belt essentially pulls the checks and stubs along, and the machine automatically inspects and compares the amounts, inscribes an audit trail, endorses and separately batches both bills and checks and finally produces payment records and deposit slips for transfer of the funds to the bank.

The operator only has to handle the check and stub once, Brandels stated.

The microcomputer permits the remittance processor to deal simultaneously with single or intermixed account numbers. The device can be programmed for each billing department's operations, he noted.

Different Machine

Brandeis believes his firm's machine is different because it handles punch cards and optical documents. Even if the stub document is mutilated, the payment can be processed as long as the account number can be read.

In addition, the machine's memory permits an automatic lookup of those account numbers that are invalid for some reason. The memory also allows alphanumeric communications with the operator, avoiding the use of codes, Brandeis said.

The alpha character capability made possible by a sizable memory lets the company write a detailed audit trail on the back of the check, thus making the whole transaction less mysterious to the consumer, he added.

The "bottom line" for any remittance processor is the ability to encode the check with its amount for direct deposit at the bank. "If the machine doesn't do that, it's not doing remittance processing," Brandeis maintained.

By encoding the check, a company gets that payment into "the back door of the bank."

What About EFT?

But what about electronic funds transfer (EFT)? Won't it take a chunk out of the market Computer-Link envisions for itself?

"No contest. EFT will take a piece of the remittance-processing business. But it will only bite off that portion of check payments that shouldn't have been made by check in the first place," Brandeis state.

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UNITED KINGDOM
World rank as DP market: *Fourth*
1975 DP expenditures: *$2.7 Billion*
1975 imports from US: *$270 Million*
Rank as importer from US: *Third*
Computer Management is a monthly magazine recently purchased by *Computerworld, Inc.* Munthly circulation is 30,000.

COMPUTERWOCHE
GERMANY
World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*
Computerwoche is a weekly tabloid newspaper started by *Computerworld, Inc.* It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
JAPAN
World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*
Shukan is a weekly tabloid newspaper, jointly owned by *Computerworld* and Dempa publications. Circulation is 35,000.

ZERO-UN INFORMATIQUE
FRANCE
World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$223 Million*
Rank as importer from US: *Fourth*
Computerworld represents Zero-Un Informatique in the US. Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000; the second a monthly magazine, circulating 13,000 copies; and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS
BRAZIL
World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*
DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by *Computerworld, Inc.* and has a circulation of 7,000.

Computerworld now has sister publications in five leading international markets for US computers and computer-related equipment. These markets import in excess of a billion dollars of US-made computer products. The publications are operated and edited by local experts, and published in the language of the computer people they serve. And they do an excellent job of covering their markets.

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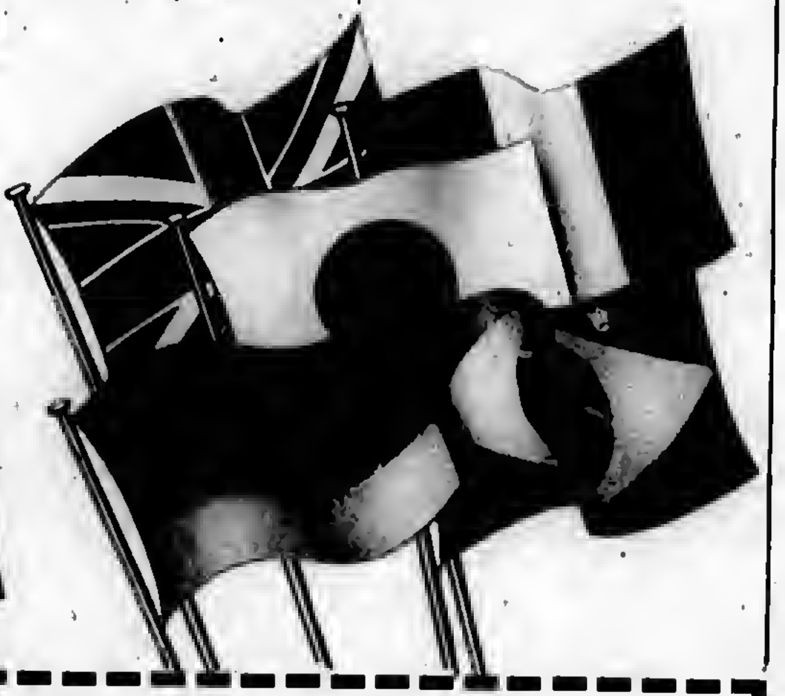

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95 Other: ____________

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11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
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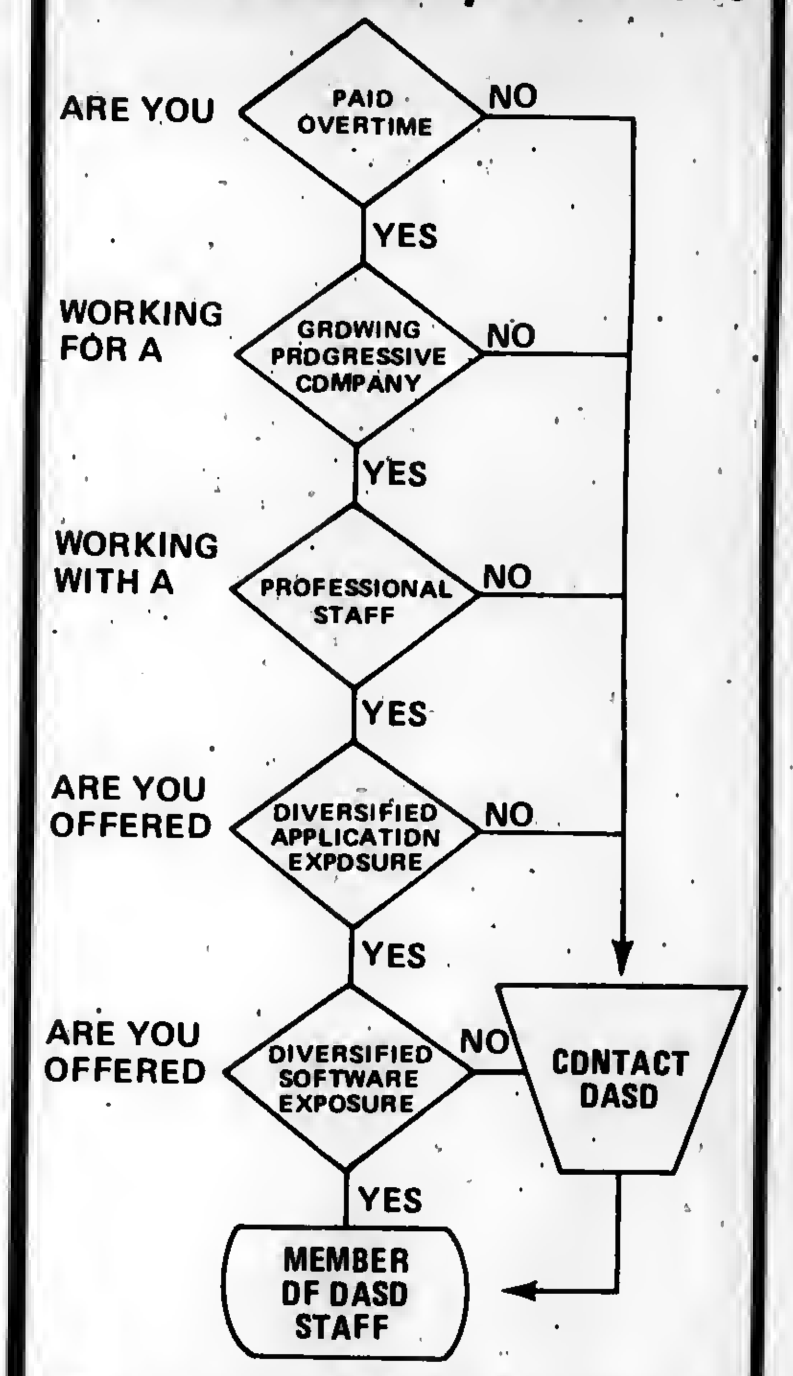

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Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software. Prefer a minimum of 3 years' experience in structured design, coding, testing and documentation of programs; development with large data base on multi-file computers and real-time systems, HIPO design documentation, TSO usage and software simulation techniques. Requires a BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1 Fortan, Assembler, Intel 8080 and PDP-11 programming languages.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software; including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

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Responsible for the analysis of teletraffic probability and queuing problems on digital and analog switching systems and the development of computer programs for switching systems. Perform control and route reliability studies, define and analyze problems for future systems features and their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specification, and exposure to switching system specifications. Requires a BS or MS in Electrical Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

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We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing mini-computers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

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Degree in DP or business with 5 years' experience in business programming and systems analysis. Responsible for the analysis of company systems problems and solutions. Required to make formal presentations and submit written reports for review purposes. Knowledge of Burrough's software, NDL and data base desired.

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Position requires 4-6 years' real-time experience with knowledge of FORTRAN and Assembly language. Experience with process control and MODCOMP computer systems is preferred. Duties include system design and coding, supervision of programmers, on-site installation of finished systems and interaction with customers.

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San Diego State University

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Further information may be obtained from Professor J. Reinfelds. This is a limited term appointment of up to 4 years. Closing date 1st Dec., 1977.

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For details of appointment write to the Bursar, The University of Wollongong, Box 1144, P.O., Wollongong, New South Wales, 2500, Australia.

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Candidates should have a minimum of two years applications programming experience with knowledge of COBOL or FORTRAN preferred for areas related to math, commercial, economics, environmental or energy applications. Openings exist for individuals at all levels through project manager. Degree preferred.

MARKETING SUPPORT ANALYSTS

Should have Bachelors Degree or equivalent at all experience levels in the data processing industry. Candidate should have experience in the analysis of hardware and software requirements. Knowedge of time-sharing usage or graphics desirable but not required. Should have knowledge of products in one of the following ereas: CDC large systems 6000/7600, CYBER 70/170 series; but other third generation computer will be considered. Openings exist for individuals at all experience levels.

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Candidate should have knowledge of system design techniques and at least one data base management system (prefer TOTAL, IMS, SYSTEMS 2000, etc.) Must have minimum of three years experience in COBOL and/or FORTRAN. Degree desirable.

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Technical degree or equivalent plus one or more years experience for support of CONTROL DATA CORPORATION's worldwide CYBERNET Time-Sharing Network. Potential candidates must have at least two of the following languages: COBOL, FORTRAN, APL, BASIC or ASSEMBLY LANGUAGE. Desire CDC 6000 CYBER 70 series experience, but will consider other large scale third generation computers. Candidates must have good oral communication, enjoy troubleshooting customer's problems & have ability to interface with customers.

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- Technical proficiency including a working knowledge of Cobol and exposure to assembler
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OPENINGS EXIST IN THE FOLLOWING LOCATIONS
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Newton, Mass. 02160

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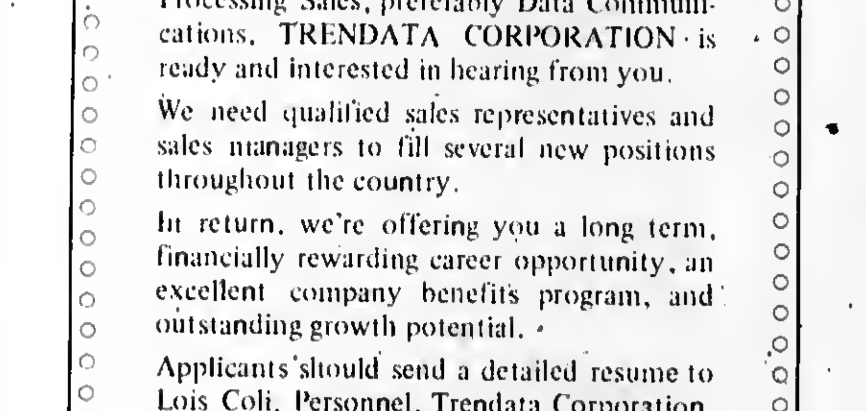

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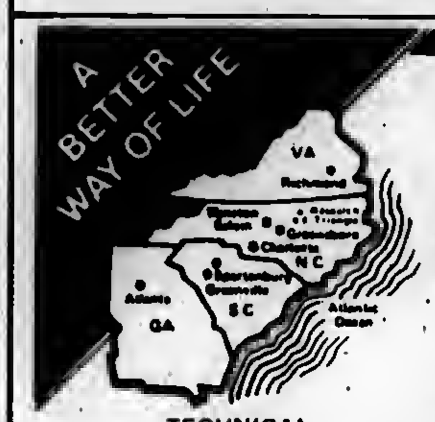

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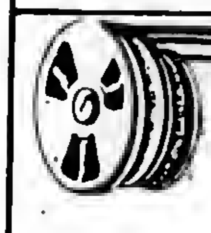

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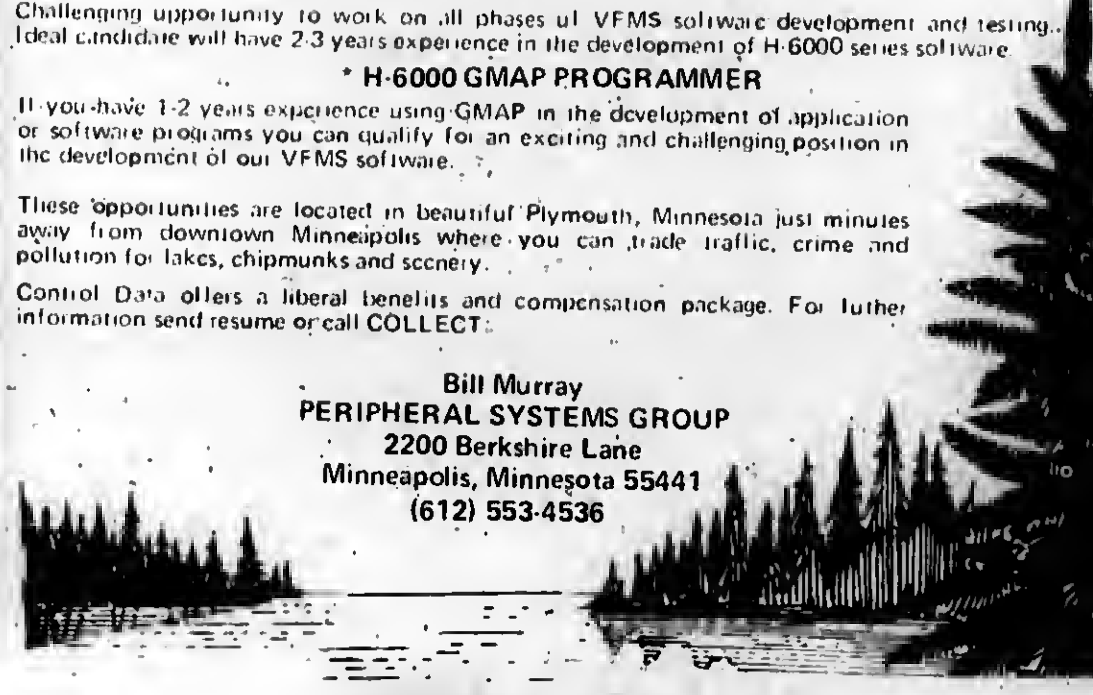

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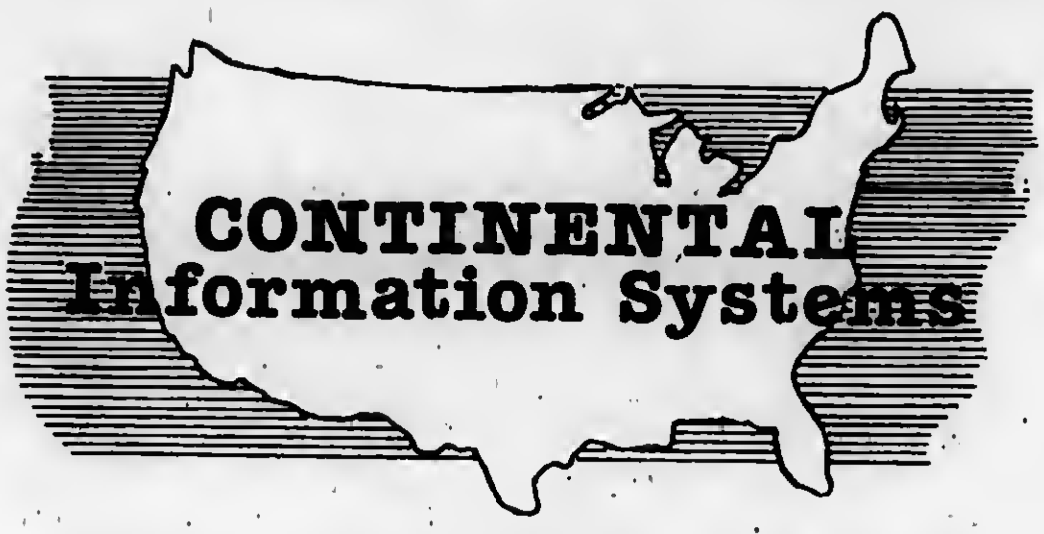

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Request for Proposal No. 323 for the acquisition of a raster graphics display system to attach to an existing Data General Eclipse S/130.

Request for Proposal No. 324 for the acquisition of a small general purpose computer system and software necessary to process payroll, general accounting, and student scheduling for a small Mississippi junior college.

Request for Propoal No. 325 for the lease of a small graphics system capable of communicating with a 370/155 and producing maps and digitizing mileage from the maps.

Request for Proposal No. 326 for the purchase of a binary synchronous communications adapter to enable a 360 Model 20 to communicate as an RJE station to a 370/155.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to rejct any and all bids and proposals and to waive informalities. Clyde P. Ballard, Executive Director, Central Data Processing Authority.

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Request for Proposal No. 327 for the purchase of the necessary modifications to existing Cambridge Memories, Inc. memory to enable the installation of a Dynamic Address Translation (DAT) feature to an existing IBM 370/155.

Request for Proposal No. 328 for the purchase of additional Cambridge Memory (CMI) for an existing IBM 370/155.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities. Clyde P. Ballard, Executive Director, Central Data Processing Authority.

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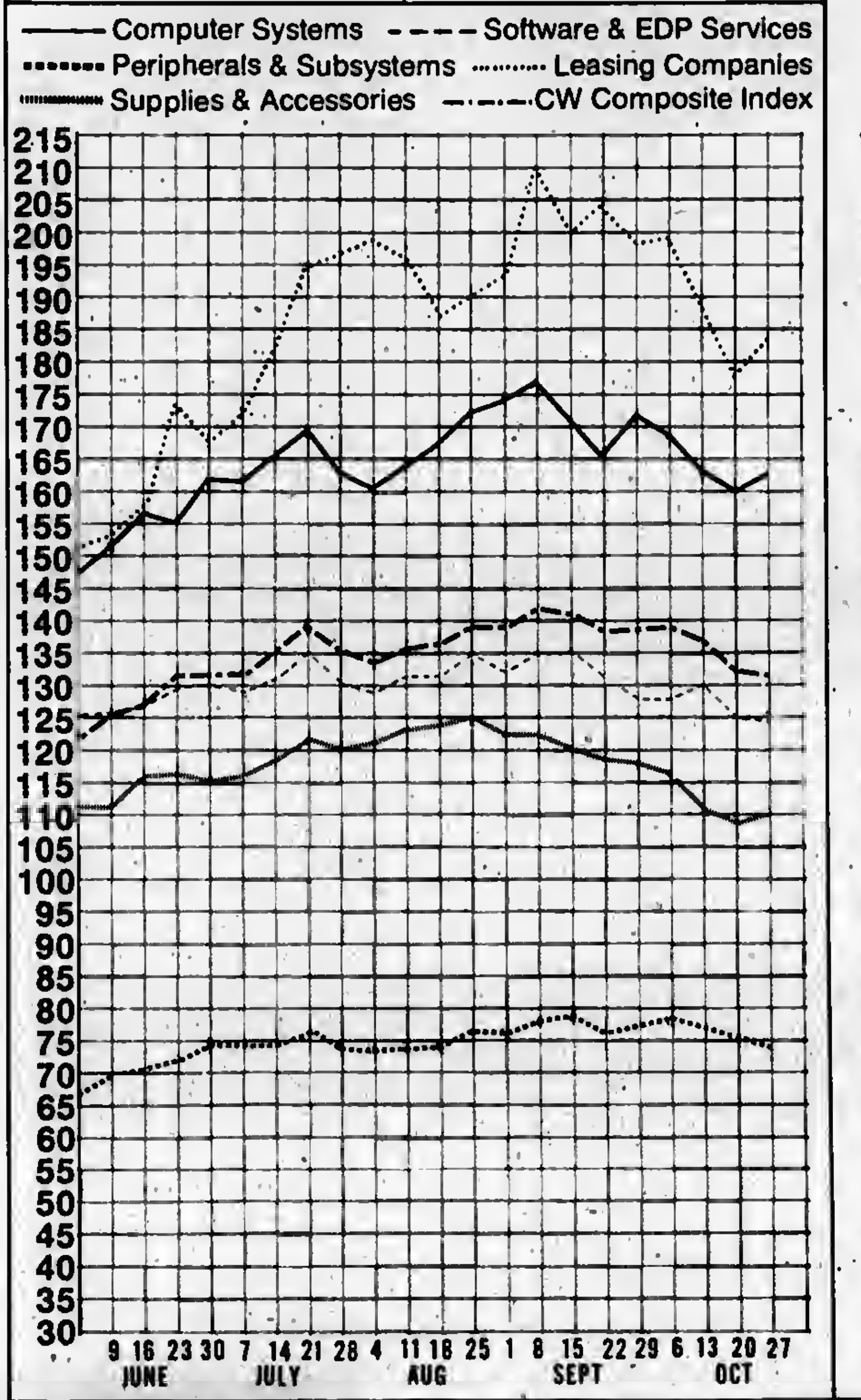

Earnings Reports

DATA DIMENSIONS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.12	$.14
Revenue	2,490,000	2,066,000
Earnings	88,000	111,000
6 Mo Shr	.21	.28
Revenue	4,899,000	3,773,000
Earnings	169,000	220,000

DATA GENERAL
Three Months Ended June 4

	1977	1976
Shr Ernd	$.68	$.52
Revenue	60,507,000	44,470,000
Earnings	6,780,000	5,118,000
8 Mo Shr	1.82	1.33
Revenue	168,514,000	114,127,000
Earnings	19,043,000	13,051,000

a-Restated to reflect results of Digital Computer Controls, Inc., acquired on pooling-of-interests basis.

DATAPRODUCTS
Three Months Ended June 25

	1977	1976
Shr Ernd	$.44	$.48
Revenue	30,011,000	26,700,000
Earnings	3,319,000	a3,575,000

a-Includes $1,118,000 gain from sale of building.

DATUM
Three Months Ended June 30

	1977	1976
Shr Ernd	$.09	$(.26)
Revenue	3,811,000	3,202,000
Tax Cred	89,000	.....
Earnings	151,000	(479,000)
6 Mo Shr	.14	(.25)
Revenue	7,250,000	8,742,000
Tax Cred	114,000	.....
Earnings	252,000	(432,000)

DOCUTEL
Three Months Ended June 30

	1977	1976
Shr Ernd	.....	$.26
Revenue	$7,447,000	8,422,000
Tax Cred	.....	343,000
Earnings	(47,000)	688,000
6 Mo Shr	.....	$.50
Revenue	13,856,000	18,870,000
Tax Cred	.....	644,000
Earnings	(205,000)	1,300,000

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TRADE QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	39 1/4	-3	-7.1
N	BURROUGHS CORP	55- 91	66 1/4	+1 1/4	+1.9
O	COMPUTER AUTOMATION	18- 30	23	+2	+9.5
N	CONTROL DATA CORP	20- 26	21 3/8	+1	+4.9
O	CRAY RESEARCH INC	15- 29	22 1/4	+ 1/4	+1.1
N	DATA GENERAL CORP	35- 51	45	+1 1/2	+3.4
N	DATAPOINT CORP	18- 32	28 1/4	+1	+3.6
N	DIGITAL EQUIPMENT	37- 53	45	+1 7/8	+4.3
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	9 5/8	- 1/8	-1.2
O	FOUR-PHASE SYSTEMS	13- 19	16 5/8	+ 1/8	+0.7
N	FOXBORO	41- 54	42 3/4	- 5/8	-1.4
O	GENERAL AUTOMATION	6- 9	6	0	0.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	70 1/2	- 5/8	-0.8
N	HONEYWELL INC	43- 55	45 5/8	+2 3/4	+6.4
N	IBM	245-286	260 1/2	+4 1/2	+1.7
O	MANAGEMENT ASSIST	5- 9	7 1/8	+ 1/8	+1.7
O	MICRODATA CORP	7- 18	11 3/8	+ 1/8	+1.1
O	MODULAR COMPUTER SYS	5- 8	6 1/4	+ 1/8	+2.0
N	NCR	32- 47	41 1/2	+2 3/4	+7.0
O	PRIME COMPUTER INC	12- 23	20 1/2	+ 5/8	+3.1
N	PERKIN-ELMER	17- 22	18 3/4	- 1/4	-1.3
N	RAYTHEON CO	16- 33	29 7/8	+ 3/8	+1.2
N	SPERRY RAND	30- 42	30 3/4	+ 3/4	+2.5
O	SYCOR INC	8- 15	14	+2 1/2	+21.7
A	SYSTEMS ENG. LABS	5- 8	6 7/8	- 3/8	-5.1
A	WANG LABS.	10- 14	11 1/8	- 7/8	-7.2

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	0	0.0
O	BOOTHE COURIER CORP	8- 10	10 3/8	+ 5/8	+6.4
O	COMDISCO INC	10- 13	10 1/2	+ 3/4	+7.6
A	COMMERCE GROUP CORP	1- 3	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2	0	0.0
N	DPF INC	6- 9	7 7/8	+ 1/8	+1.6
N	ITEL	13- 22	17 1/2	+ 5/8	+3.7
N	LEASCO CORP	19- 27	22 3/8	+1 3/8	+6.5
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/8	0	0.0
N	U.S. LEASING	10- 15	12 1/2	+ 5/8	+5.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1/2	0	0.0
O	ANACOMP INC	7- 10	8 1/2	- 1/4	-2.8
A	APPLIED DATA RES.	5- 10	7 1/2	- 3/4	-9.0
N	AUTOMATIC DATA PROC	23- 30	26 1/2	+1 7/8	+7.6
O	COLEMAN AMERICAN COS	2- 2	1 7/8	+ 1/4	+15.3
O	COMPU-SERV NETWORK	9- 15	9 3/4	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	- 1/2	-5.2
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 1/4	- 1/4	-2.6
N	COMPUTER SCIENCES	7- 9	7 3/4	- 5/8	-7.4
O	COMPUTER TASK GROUP	1- 2	1 7/8	- 1/8	-6.2
O	COMPUTER USAGE	1- 3	1 1/2	+ 3/8	+33.3
O	COMSHARE	5- 8	6 1/2	0	0.0
O	DATA DIMENSIONS INC	3- 5	4 1/8	+1	+32.0
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	14	- 1/4	-1.7
O	INSYTE CORP	2- 3	1 1/4	- 1/4	-16.6
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4 1/4	- 1/8	-2.8
O	KEYDATA CORP	2- 3	1 1/2	- 1/8	-7.6
A	LOGICON	7- 17	12 3/8	+ 1/4	+2.0
A	MANAGEMENT DATA	1- 2	1	- 3/8	-27.2
A	NATIONAL CSS INC	19- 27	24 1/8	- 1/2	-2.0
O	NATIONAL DATA CORP	4- 7	6 1/8	- 1/2	-7.5
A	ON LINE SYSTEMS INC	16- 22	16 3/8	+ 3/8	+2.3
N	PLANNING RESEARCH	3- 6	3 7/8	- 5/8	-13.8
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 5/8	+ 1/8	+5.0
O	REYNOLDS & REYNOLD	17- 20	17 1/2	- 1/2	-2.7
O	SCIENTIFIC COMPUTERS	1- 4	3 1/4	- 1/2	-13.3
O	TYMSHARE INC	14- 23	18 7/8	+ 1/4	+1.3
A	UPS SYSTEMS	4- 5	4 3/8	0	0.0
N	WYLY CORP	1- 2	3/4	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	12 7/8	+ 1/8	+0.9
O	ADVANCED MEMORY SYS	5- 9	6 3/4	- 1/8	-1.8
N	AMPEX CORP	8- 11	9 1/4	- 3/8	-3.8
O	ANDERSON JACOBSON	3- 5	3 3/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	13 1/2	- 3/8	-2.7
O	BEEHIVE INT'L	8- 12	7 3/4	- 3/8	-4.6
A	BOLT,BERANEK & NEW	7- 9	7 3/8	+ 3/8	+5.3
N	BUNKER-RAMO	8- 12	10 3/8	- 1/8	-1.1
A	CALCOMP	3- 5	3	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3 1/2	+ 1/4	+7.6
N	CENTRONICS DATA COMP	20- 30	20 1/2	+ 1/2	+2.5
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	5 5/8	- 1/2	-8.1
O	COMPUTER CONSOLES	4- 7	3 3/4	- 1/4	-6.2
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/4	0	0.0
O	COMTEN	9- 13	9 3/4	- 3/4	-7.1
N	CONRAC CORP	19- 28	19 7/8	-1 3/8	-6.4
O	DATA ACCESS SYSTEMS	4- 5	3 1/2	0	0.0
O	DATA 100	6- 9	7 3/8	0	0.0
A	DATA PRODUCTS CORP	9- 17	15 5/8	+1 1/8	+7.7
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 3/4	0	0.0
O	DECISION DATA COMPUT	2- 3	1 7/8	- 1/8	-6.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 1/8	- 1/8	-1.7
O	DATARAM CORP	2- 12	10 1/4	- 1/4	-2.3
N	ELECTRONIC M & M	4- 5	3 5/8	- 1/4	-6.4
O	FABRI-TEK	1- 2	1 1/8	-	-5.3
O	GENERAL COMPUTER SYS	0- 2	1 1/8	+ 1/8	+12.5
N	HAZELTINE CORP	8- 12	8 1/8	0	0.0
N	HARRIS CORP	28- 39	36 7/8	-1	-2.6
A	INCOTERM CORP	10- 17	17	+1	+6.2
O	INFOREX INC	4- 7	5	+ 1/2	+11.1
O	INFORMATION INTL INC	9- 14	9 3/4	- 3/4	-7.1
O	INTEL CORP	38- 57	43	+ 1/2	+1.1
A	LUNDY ELECTRONICS	3- 6	4 1/8	- 3/8	-8.3
O	MSI DATA CORP	6- 13	11 7/8	- 3/8	-3.0
O	MEMOREX	23- 34	26 3/4	+ 1/4	+0.9
N	MOHAWK DATA SCI	5- 8	5 3/8	- 3/8	-6.5
O	PENRIL CORP	2- 5	3 3/4	- 1/8	-3.2
A	PERTEC CORP	7- 9	8 3/4	+ 1/8	+1.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 1/2	- 1/8	-3.4
O	RECOGNITION EQUIP	6- 10	7	- 1/2	-6.6
O	SCAN DATA	1- 2	7/8	-	-6.2
O	STORAGE TECHNOLOGY	10- 18	16 1/8	+ 3/4	+4.8
O	T BAR INC	7- 13	10 5/8	-1 1/2	-12.3
O	TALLY CORP.	4- 6	3 7/8	+ 1/4	+6.8
A	TEC INC	7- 10	7 3/8	+ 1/8	+1.7
N	TEKTRONIK INC	29- 38	37	+1 3/4	+4.9
N	TELEX	2- 3	2 1/8	- 1/8	-5.5
O	WILTEK INC	1- 1	1/2	- 1/4	-33.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE OCT 26 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	5 7/8	- 1/4	-4.0
O	BALTIMORE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	12 1/2	+ 1/4	+2.0
O	CYBERMATICS INC	1- 1	1	+ 1/8	+14.2
O	DUPLEX PRODUCTS INC	14- 19	17	0	0.0
N	ENNIS BUS. FORMS	6- 7	5 3/4	- 1/8	-2.1
O	GRAHAM MAGNETICS	11- 17	16 3/4	- 1/8	-0.7
O	GRAPHIC CONTROLS	13- 18	14 1/4	+1 1/2	+11.7
N	3M COMPANY	46- 56	46 1/2	-1 1/2	-3.1
O	MOORE CORP LTD	24- 37	24	-1 5/8	-6.3
N	NASHUA CORP	16- 28	18 5/8	- 3/8	-1.9
O	STANDARD REGISTER	18- 25	21 1/4	+ 3/4	+3.6
O	TAB PRODUCTS CO	10- 19	9 3/4	- 1/4	-2.5
N	UARCO	18- 22	18 1/2	0	0.0
A	WABASH MAGNETICS	10- 15	11 1/4	+ 3/8	+3.4
M	WALLACE BUS FORMS	17- 21	18 5/8	0	0.0

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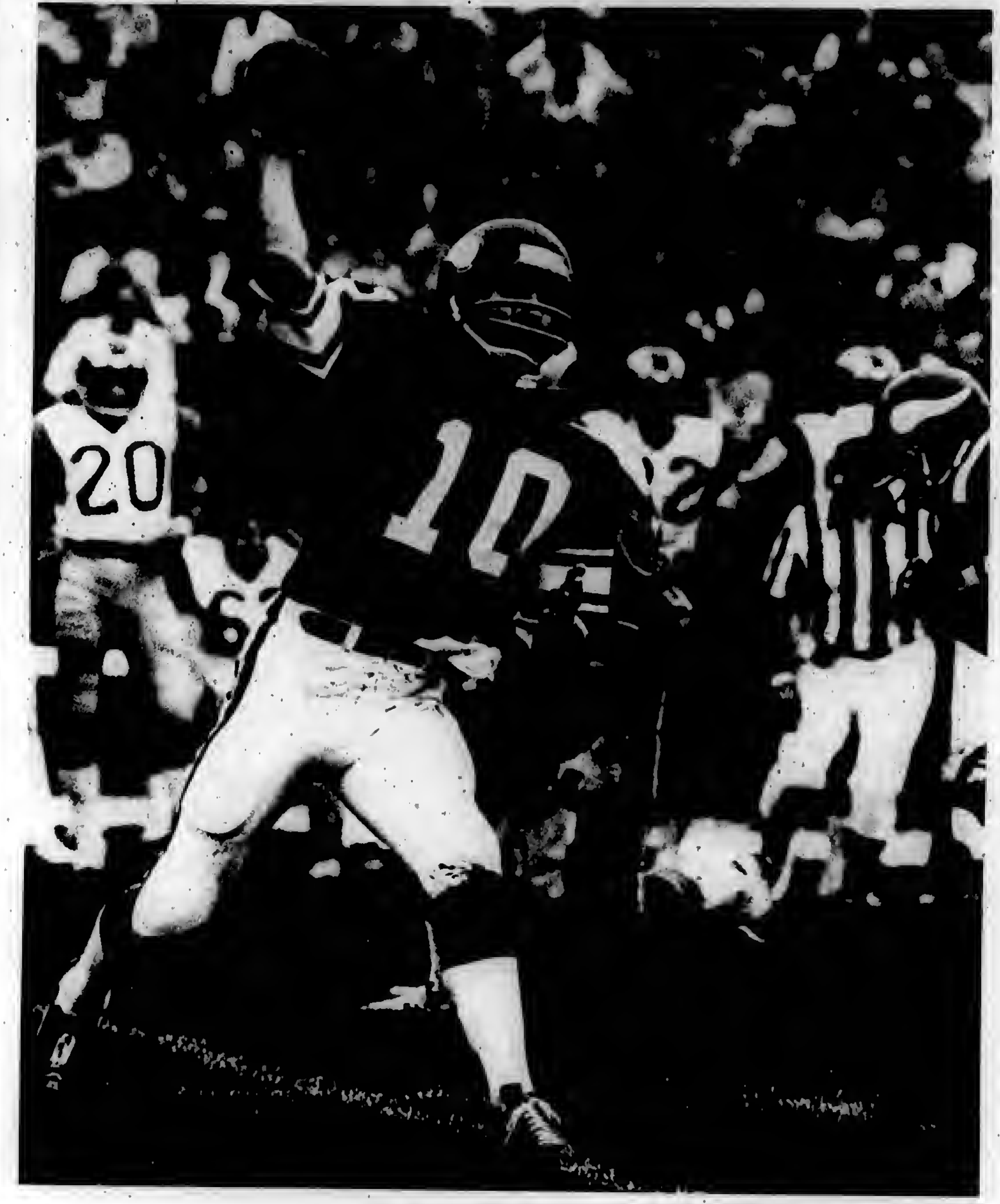

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NEWSPAPER

On-Line Lit — Can You 'Bear' It?

By Jeffry Beeler
CW Staff

IRVINE, Calif. — If you know anything about data processing, you've probably already heard about electronic music and computer art. But did you know that mainframes have begun to enter yet another realm of artistic endeavor?

If not, brace yourself. The age of computer literature is upon us.

Of course, on-line lit is still a long way from cracking the bestseller list, and no one expects great poetry to start flowing from the world's DP rooms right away. Indeed, computers may never take their place alongside Shakespeare and Tolstoy in the ranks of history's great writers.

On the other hand, one of the first experiments in computer literature is already well under way at the University of California here, and although the results thus far are still admittedly a little primitive, they are almost sure to improve in stylistic quality during the next few years, according to Dr. James R. Meehan, who ought to know.

Two years ago Meehan, now an assistant professor in the university's information and computer science department, began developing a story-writing program dubbed "Tale-Spin" as part of his doctoral dissertation at Yale.

Today, the program is "teaching" a 75K-byte Digital Equipment Corp. PDP-10 at the university's computing center to fashion fictional vignettes

(Continued on Page 4)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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And Warned to Watch Language

Memos Show IBM Brass Told to Launder Files

By Catherine Arnst
CW Staff

NEW YORK — Top IBM executives were told to "launder" their files after the Justice Department began investigating the firm for antitrust violations, according to government charges made here.

The IBM legal department also instructed the IBM executives to change the way they characterized the industry after the antitrust investigation began, the Justice Department contended.

The government reached these conclusions after studying several documents that IBM has been attempting to keep out of the public record in the U.S. vs. IBM case for almost nine years.

The documents have just been entered into evidence after all the IBM moves to bar them from the government — including two appeals to the appeals courts and one to the Supreme Court — have been rebuffed.

The documents show that IBM had "guilty knowledge" of its power in the computer marketplace and that "IBM's highest corporate officials recognized IBM's monopoly power in 1966 and undertook by laundering the language of such officials to minimize the likelihood of detection and liability," the Justice Department said.

In addition to laundering then-current files, the IBM executives were told to watch their language in the future and warned to "avoid references to the inexperience or naivete of IBM's customers or to their dependence on IBM," among other things.

One of the documents, dated Nov. 6, 1970 and circulated in IBM's Data Processing Division (DPD) headquarters, described a request from the Department of Justice for information regarding the pricing of the 2319 disk

(Continued on Page 6)

Laced With Dissension

EFT Commission Delivers Report

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — After almost two years and $2 million, the National Commission on Electronic Fund Transfers (EFT) has issued its final report with more of a whimper than a bang.

Throughout its one-year, nine-month history, the commission has dribbled out portions of the report, making the 389-page document more of an anticlimax than a culmination.

Furthermore, almost one-third of the working portion of the report is composed of sharp dissents from commission members unhappy with the document's conclusions (see story on Page 5).

The dissenters charged the commission with leaving "unfinished business," not doing the job it was established to do, making "inconsistent" recommendations and generally failing to come to grips adequately with consumer issues.

The report itself begins by stating that EFT systems can make "conventional consumer financial transactions simpler, more convenient and potentially less costly.

"EFT could also increase the security of these transactions by reducing the risk of theft of currency or checks and the unauthorized use of checks. Moreover, EFT may be able to serve low-income households that today do not have an account relationship with a depository institution," the report said.

Finds No Harm Yet

In its most basic recommendation, the commission — having "found no evidence that EFT has yet caused harm to financial markets, financial institutions or consumers" — said "the appropriate approach to these new financial service concepts is, in general, to permit their further evolution in a relatively unconstrained way."

However, the group did find "some instances" where existing law and regulation might not be adequate and recommended some actions in the following areas: consumer interests, developmental issues in EFT, technology and the role of the federal government.

Having stated EFT would be good for consumers, the commission later noted it learned "that many consumers are reluctant to accept many EFT concepts. Some consumer concerns may

(Continued on Page 4)

Boston Arson Victims Push For Fire Prediction System

By Jeffry Beeler
CW Staff

BOSTON — A rash of suspicious fires here and in surrounding communities has prompted a citizens group to seek funding for a computer system that proponents say would predict when a building is likely to fall victim to an arsonist's torch.

If implemented, the anti-arson computer would become the first of its kind anywhere, according to Ernest Garneau of Greater Boston Community Development, a municipal agency assisting the system's development.

Dubbed Housing Early Warning System (Hews) by its supporters, the proposed system has already gained the endorsement of several local political leaders and public officials including the state fire marshal. Efforts to underwrite the arson-prevention program are being spearheaded by members of the Symphony Tenants Organization Project (Stop), which has contacted several federal agencies in an attempt to secure a $180,000 grant to develop the system.

Stop members proposed the system in response to an epidemic of 35 suspicious fires that plagued this city's

(Continued on Page 6)

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CW at Interface

On Five Levels

Work on Protocols Seen Advancing

By Ronald A. Frank
CW Staff

LOS ANGELES — The new generation of protocol standards is developing at five different levels, all of which are important to users, according to James W. Conard, manager of engineering in the Communications Systems Division of Control Data Corp.

Even at Level 1, which is the electrical and mechanical interface, a standard is evolving that will require adapters to be used by customers. The new standard is known as RS-XYZ and it will replace the familiar RS-232 on data terminal equipment, Conard told attendees of a session on data communications architecture at the Interface West conference here last week.

One of the major differences in the RS-XYZ standard is the use of a 37-pin connector. This requires the installation of an adapter to convert from the familiar 25-pin RS-232, and some of these are beginning to appear, Conard said.

Changes are also taking place at Level 2, which deals with the link protocol. This level includes data flow initialization, control termination and error recovery procedures.

In this area, the American National Standards Institute (Ansi) is working on the Advanced Data Communications Control Procedure (ADCCP), which eventually will be designated X3.66. The International Standards Organization (ISO) is studying a link-level protocol known as Higher Level Data Link Control (HDLC), which is composed of four standards: IS 3309, IS 4335, DP 6159 and DP 6256, he said.

Still within Level 2, the CCITT has called its Link Access Protocol X.25, while the European Computer Manufacturers Association (ECMA) works with HDLC. The U.S. government is adopting ADCCP as Federal Standard 1003.

To provide further variations within Level 2, American manufacturers including IBM, Burroughs Corp., NCR Corp. and Control Data Corp. are coming out with their own link protocol standards. Other vendors are working on their own link protocol standards, Conard said.

Within Level 3, the virtual call standards are being developed to handle network management, block or packet structure and message format questions in networks. Within X.25, considerations are under way dealing with call setup and clearing; data and interrupt; flow control and reset; and restart procedures. Although X.25 has been adopted by the CCITT as an overall standard, work is still underway to refine various aspects of it, Conard told the attendees.

At the higher levels 4 and 5, the picture becomes less definitive and work is just starting. Level 4 deals with system protocol and includes packet or message assembly and disassembly; priorities and codes. Work on the packet assembly/disassembly (PAD) falls within this level.

Level 5 is the most indefinite of all since this will deal with the user application protocol concerning user-level programs, operators and device dependency questions.

One of the criteria that makes levels 4 and 5 difficult to define is that somewhere in this area, the transition is made from data communications to data processing. This question in itself raises separate legal and regulatory questions.

Within Level 5, the trend toward distributed data bases has to be taken into account, according to Dan Zatyko, director of distributed computing systems with Basic/Four Corp.

The new bit-oriented protocols will make it possible for both batch and inquiry/response transactions to be handled on the same line. Problems of data base synchronization among multiple processors arise at this level, Zatyko told the session.

In the evolving systems, it will be possible to remove many functions from the main DP center and place them in various remote processors in the network, he said.

Encryption Chip Validated

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has validated a microprocessor chip implementing the Federal Data Encryption Standard.

The chip, made by Rockwell International's Collins Group, is the first commercial implementation of the standard to be accredited by the bureau.

One of the validation tests consists of 12 million enciphering and deciphering operations using random data and keys, NBS said. The NBS certification allows the manufacture and sale of identical devices to federal agencies desiring to use the standard.

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  SUM — to add the values in two records that have equal control fields and eliminate one record;
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EFT Commission's Final Report Anticlimactic

(Continued from Page 1)

result from a lack of experience with these new ideas, but others are well founded."

In the privacy arena, for example, the commission found present safeguards "are not adequate to deal with the threats to privacy that may arise with EFT."

But the commission did not propose any legislation for protecting privacy, recommending only that "government should minimize the extent to which, first, it requires an institution to maintain or report records generated by an EFT system and, second, it requires information to be collected by an EFT system that is not required as a matter of sound business practice.

"It also recommends that EFT systems not be used by government for surveillance, to learn either a consumer's physical location or his patterns of behavior."

However, the commission would allow law enforcement bodies to gain access to the records. In most instances this would call for a subpoena that could be contested by the individual whose record was sought, but the door was left open in certain cases for law enforcement officials to access records first and notify the data subject later.

As to private-sector access to information in an EFT system, the commission recommended (by "unanimous voice vote in favor, except for one negative vote," in the commission's words) that "information concerning an individual that is collected or generated by an EFT system ... should be treated as confidential by the individual's depository institution ... and should not be disclosed to third parties except with the specific consent of the individual, or as otherwise provided in the exceptions noted below."

The exceptions allow credit grantors, credit bureaus and credit authorization services to access information on an EFT user's credit standing. Furthermore, an EFT system could be used to track down the new address of someone who had a bad debt at an older address.

In one of its few concrete legislative recommendations, the commission did recommend that the Fair Credit Reporting Act be amended to ensure that its provisions — giving consumers the right to see and correct their records when denied credit — cover EFT systems.

In other areas of consumer concern, the commission advocated the enactment of legislation to "require institutions to mail or deliver statements to consumers for any month in which an EFT transaction takes place."

At the same time, however, such statements "would not be required where preauthorized credit transactions are the only electronic items on an EFT account."

The commission also feels there is no need "at this time to legislate the right to stop or reverse EFT payments," as a consumer can presently do by stopping payment on a check.

It did recommend, however, that the consumer not be liable for his account if a bank card is stolen or lost, unless the bank can prove the accountholder had written his personal identification number (PIN) on the card or otherwise kept the PIN with the card.

Branch Banking

In one of its few startling recommendations, the commission called for state and federal laws governing branch banking to be set aside when terminals instead of brick-and-mortar buildings are used.

The commission would allow banks to offer debit services anywhere in the country through terminal systems and would permit the immediate expansion of deposit-taking services statewide and then "across contiguous state lines to serve natural market areas.'

In other words, users with a debit card from a New York bank would be able to use that card in California if the New York bank had a terminal there; a New York bank could expand its deposit-taking activities into places such as New Jersey, Connecticut and Pennsylvania if these were construed as "natural market" areas for the bank.

Most banks presently are limited to doing business within their home state.

In the area of security, the commission played down consumers' concerns about the security of their financial records in EFT systems, but did recommend that state and federal regulatory agencies develop uniform security regulations and that "all state and federal financial institution regulators should consider joint solutions to common problems of security supervision."

It also backed the legislation proposed by Sen. Abraham Ribicoff that would place heavier penalties on computer criminals than in the past.

On-Line Lit: No Threat to Shakespeare

(Continued from Page 1)

whose characters and events bear a reasonable likeness to those in the real world. During the next few years, Meehan hopes to refine Tale-Spin even further to produce stories comparable in quality and effect to Aesop's fables.

Starts With Problems

Tale-Spin bases its stories on problems it gives its main characters and then generates events from the characters' attempts to solve those problems.

If, for example, a character is given the problem of hunger, the program, which is written in an Algol-like language called MLIFT, creates dramatic actions that allow the individual to find and obtain food.

The mechanism responsible for devising solutions to character problems is called the problem solver. Tale-Spin also incorporates two other active components — an assertion mechanism and an inference mechanism.

The assertion mechanism contains basic knowledge about the world, including facts about problem solving, relationships between people, character traits, bodily needs and story structure. It then files this knowledge as needed in a DEC RK04 disk drive unit.

The inference mechanism in turn determines all the possible consequences of each fact, Meehan added.

Working together, the three active components combine the basic narrative building blocks — fact, inference and problem — to form finished stories.

The result is a model of human behavior that Meehan claimed can help psychologists test current theories of how people solve problems.

"What we have devised is really a different approach to the study of human psychology," Meehan explained.

How reasonable a character's actions are depends in part on the completeness of the information Meehan programs into the computer.

When given all the facts it needs, Tale-Spin creates narratives like the following piece entitled "Joe Bear and Jack Bear":

"Once upon a time, there were two bears named Jack and Joe, and a bee named Sam. Jack was very friendly with Sam but very competitive with Joe, who was a dishonest bear.

"One day, Jack was hungry. He knew that Sam Bee had some honey and that he might be able to persuade Sam to give him some. He walked from his cave, down the mountain trail, across the valley, over the bridge, to the oak tree where Sam Bee lived. He asked Sam for some honey. Sam gave him some.

"Then Joe Bear walked over to the oak tree and saw Jack Bear holding the honey. He thought that he might get the honey if Jack put it down, so he told him that he didn't think Jack could run very fast.

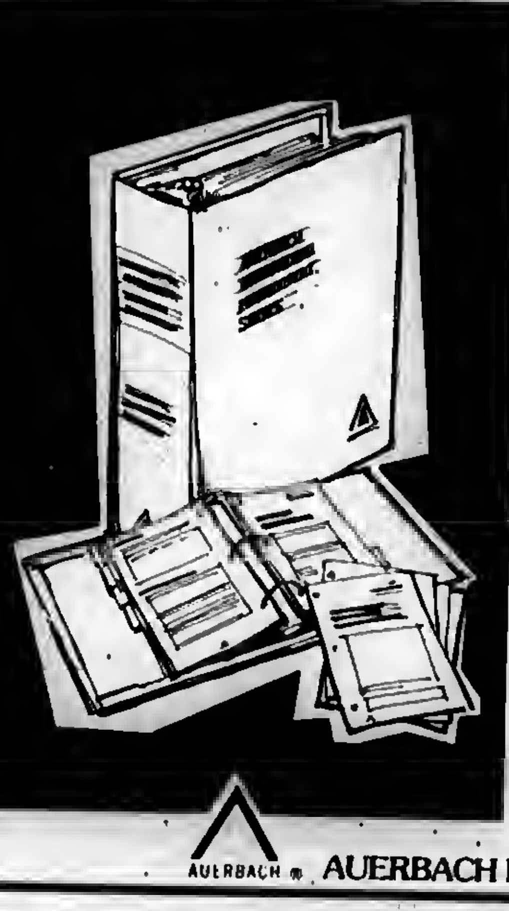
"Jack accepted this challenge and decided to run. He put down the honey and ran over the bridge and across the valley. Joe picked up the honey and went home."

Sometimes, however, Meehan unintentionally omits a vital fact from his program, with unexpectedly humorous results:

"One day Joe Bear was hungry. He asked his friend Irving Bird where some honey was. Irving told him there was a beehive in the oak tree. Joe threatened to hit Irving if he didn't tell him where some honey was."

Although Irving Bird had answered Joe Bear's question, the computer "didn't realize" that fact because it had not been informed that honey comes from beehives, Meehan said. After he added the missing data to the program, the computer rewrote the story with a happier ending:

"One day Joe Bear was hungry. He asked his friend Irving Bird where some honey was. Irving told him there was a beehive in the oak tree. Joe walked to the oak tree. He ate the beehive."



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Also Cite Group's Makeup

Unhappy EFT Commissioners Hit Time Lack

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — The members of the National Commission on Electronic Fund Transfers (EFT) unhappy with the group's final report have painted a picture of a commission dominated by business interests and so rushed for time that it was unable to fully evaluate the options before it.

The time factor is the common thread in all the dissents, whch make up almost one-third of the working portion of the report released last week, just one year and nine months after the commission's first meeting.

Verne S. Atwater, representing the mutual savings banks, spoke of "unfinished business" in the report; Fairfax Leary Jr., a public representative, wrote that some decisions were made without adequate research and other issues were not researched at all because of time constraints; the General Accounting Office representative, Donald L. Scantlebury, charged some of the recommendations "are not supported by adequate study or discussion"; and four other dissenters said they were "quite disappointed that the pressure of time prevented careful deliberation" of certain issues before the Commission.

While many of the report's sections were criticized in the dissenting opinions, the report's stands on consumer issues — particularly privacy and security of records in EFT systems — were hit hardest.

This was largely because "organized consumers, the poor, minorities, civil libertarians and small business ... were not directly represented," according to Albert A. Foer, the Federal Trade Commission's representative to the commission. "Each could have made a valuable contribution.

"In theory, of course, each could have attached well-informed lobbyists to the commission — as did many major financial institutions, corporations and trade associations — to make certain its interests were understood at every juncture. This was not done."

Because so many important groups were not represented, Foer said, "no one should misconceive the deliberations of the commission to be those of a mini-Congress."

'Rhetoric, Not Achievement'

Foer was particularly critical of the commissions work in the privacy area, calling it "far stronger in rhetoric than achievement."

While noting the commission did recommend that EFT not be used for surveillance purposes, Foer pointed out the commission did not recommend any enforcement provisions.

On the privacy side, Foer criticized the commission for recommending that debt collectors be allowed to use EFT systems in order to trace people with outstanding debts and said additional measures are needed to regulate this use of EFT.

Foer also noted that the report would allow credit grantors to refuse to tell a person why credit was denied at the point of the transaction.

"The report would authorize such notices to be given orally at the point of transaction or 'in writing at a location designated by the institution.' This is an open invitation to abuse," he claimed.

In the security area, Foer said the report "fails to acknowledge, unfortunately ... that the current fears of system compromise are very much justified.

"Focusing narrowly on past incidents in which the unauthorized penetration of electronic systems resulted in losses that were 'small' and on security problems that were 'not difficult to correct,' the report concludes both that EFT systems are potentially more secure than current paper-based funds transfer systems and that 'technical and procedural solutions to virtually all security problems are currently available.'

"The evidence does not entirely support the commission's optimistic approach to the security question," he contended.

Didn't Do Its Job

Fairfax Leary Jr., professor of law at the Delaware Law School of Widener College, charged "the commission has just not done the job it was established to do.

"The report contains no draft legislation, yet it recommends much legislation. Experience tells us that many issues do not surface until one gets down to the nitty-gritty of drafting details.

"Thus, recommendations that are expressed in high-sounding generalities break down when detailed application is sought," he added.

In the area of accuracy of information, the commission "misses a point," Leary said: "The law of credit reporting is founded on the law of defamation and, in most states, there is a conditional privilege protecting the communication of false information if believed to be accurate.

"It is high time that the antique privilege to spread untruths be abolished. Credit agencies are big business. They can afford to dispense only accurate information to legitimate recipients or pay the piper," he said.

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Documents Clash in Account of IBM Meeting

By Catherine Arnst
CW Staff

NEW YORK — IBM's alleged laundering of its files may have reached the highest precincts of the cumpany, according to documents recently entered into evidence by the government in its now almost nine-year-old antitrust suit against the firm.

The minutes of the Management Review Committee, one of the highest IBM decision-making groups, were edited for public view, two documents now in the public record show.

"The view of senior IBM management that IBM's paper machines had an anticompetitive purpose and effect was kept out of IBM's corporate records," the government charged.

Both documents were labeled as the minutes of the Management Review Committee meeting of Sept. 2, 1965, but they are vastly different.

The first, which was freely handed over to the government when it was investigating the firm, indicated that "Davis also reported on the publication of [Control Data Corp.] President [William] Norris' remark to financial analysts wherein he claimed harrassment because of our changes in 360 models. Davis and [T. Vincent] Learson were asked to prepare a position paper on this matter."

But the unedited version, which IBM has claimed is a privileged document, goes much further. It reads:

"The Control Data (CDC) annual report was next discussed. This report blames CDC's declining earnings on IBM and its frequent model and price changes. There was some sentiment that the charges were true ...

"[Al] Williams felt that the company had overreacted to DP's pessimism and that IBM had on occasion reduced profit to such a point that it left no room for competition to breathe.

"[Then-chairman of the board Thomas J.] Watson Jr. made the point that when our products were inferior, we should be particularly cautious about attempting to cure that defect by price cutting."

In defending the differences between the two documents, IBM attorney Ronald Rolfe stated in court that these minutes do not purport to be verbatim transcripts of the proceedings of a Management Review meeting.

Memos Told IBM Brass to Launder Files

(Continued from Page 1)

drive.

That memo was quickly followed by another, dated Dec. 11, 1970, directing company executives to "clean out our files" on the 2319 "in accordance with legal advice."

Another memo, this one from H. Bartow Farr Jr., general counsel for DPD, said "one of the few legitimate ways to 'manage' leasing company activity is to introduce new technologies."

The Oct. 24, 1966 memo noted, however, that "much of the advantage from that subtlety is dissipated by file emphasis on leasing company activity as a or the motivating force behind any product improvement program."

But perhaps the bedrock document for the "laundering" operation was a memo from Farr to Frank Cary, then vice-president and group director for business planning at DP Group headquarters.

The 1966 memo stated that "to create a file record of improper or suspect objectives is dangerously unnecessary. As I have said before, confining these objectives to confidential files is of no help whatever. Expressing the same thought with different words is no solution either."

The memo cuntinued with Farr's review of the DP Group's marketing objectives and some of the "problems" he found with those objectives.

In regard to the goal that "the IBM net position percentage will not be significantly lower than the previous year," Farr said: "If you have to mention the subject at all and cannot be satisfied with a revenue or profit growth objective, use 'preventing disrupting deterioration of market position.'

"While I realize you won't like this version much, I believe you will dislike it less than I dislike the other," Farr told Cary.

The DP Group also wanted to ensure that "IBM maintain present installed postion in prestige accounts in each industry segment" and that "the largest processor installed is IBM in [three] major government scientific projects plus 10 of the leading universities.

"While these objectives are not clearly objectionable," Farr said, "it would appear that they can only be achieved by suspect means (e.g., buybacks, selective pricing, extra SEs or other sales incentives)."

List of Don'ts

IBM also maintained a "list of points to be kept in mind when reviewing long-range plans and other internal IBM documents or proposed business decisions" pertaining to the Department of Justice Investigation. That list, dated July 9, 1968, was found in the files of Cary while he was still vice-president of the DP Group.

Under the topic of market share, firm members were cautioned not to "restrict discussions of IBM computer manufacturer competitors to the eight major companies ('seven dwarfs' plus SDS) . . . Expand on the classes of IBM's competitors, e.g. leasing companies and other owners of IBM machines, manufacturers of peripheral equipment . . . avoid loose, inaccurate or unnecessary documents which talk about IBM's market share, either as a whole or in any segment of the market . . . avoid predictions of a stable or increased market share for IBM . . . avoid references to large customer investments in programming or any other factors which might point toward a 'lock-in' of IBM's installed customers . . . avoid. references to the inexperience or naivete of IBM's customers or to their dependence on IBM."

Under the heading "'Performance,'" the memo suggested IBM executives not "make unnecessary comparisons of profit levels among different IBM products" and should "emphasize the DP industry's past history of rapid innovation and decreasing costs to the customer."

Under "Behavior," IBMers were told to "avoid post-mortems, case studies and other discussion of the System/360 announcements or subsequent price changes . . . Avoid pricing and related actions which are designed to maintain or increase market share at the expense of profit . . . take occasion to record any "fallout" from the Model 90 or its technology . . . Don't boast about any superiority IBM enjoys in the technology or manufacture of its components or about any unique advantages IBM enjoys by making its own components . . .

"Don't concede, even indirectly, an ability on the part of IBM to protect its investment in programs, e.g., distribution of programs on the basis of an agreement to keep confidential . . . Don't relate IBM's educational allowance, or changes in the allowance, to market conditions . . . Don't define 'normal support'; Avoid any indication of differing levels of support for different customers or different installations, even if the differences are unrelated to getting the order."

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Bostonians Want Antiarson DP

(Continued from Page 1)

Symphony Road section and several other Boston-area communities between 1973 and 1976. Those fires caused several deaths and an estimated $6 million in property damage and sparked perhaps the most intensive arson investigation in the nation's history.

Led by Assistant State Attorney General Stephen R. Delinsky, the probe thus far has netted 121 indictments against 33 persons who investigators allege were involved in a highly lucrative arson-for-profit scheme with possible organized-crime connections.

Those indicted on charges ranging from arson to fraud to murder included lawyers, real estate operators, a retired State Police detective lieutenant — and the former head of the Boston Fire Department's Arson Squad.

Arson-for-Profit Pattern

Local officials propose to use the Hews computer to maintain data files on as many as 150 of Greater Boston area's office and apartment buildings. In this computerized file, they will store information on factors like property values, mortgages, ownership transfers and tax abatements.

From recent studies of the Symphony Road fires, private investigators here have observed that a pattern involving these and other factors accompanies the typical arson-for-profit conspiracy. That pattern usually begins when a building targeted for burning falls into general disrepair with little or no attempt to halt the deterioration.

Next, the deed to the property passes through several hands in quick succession, with the landlords sharply hiking the building's selling price — and Its insurance coverage — during each exchange.

Finally, when the structure has become sufficiently decrepit and almost if not entirely vacant, the conspirators typically recruit a professional arsonist and attempt to settle their insurance claim after the resulting blaze.

By monitoring the data base for evidence of this telltale pattern of activity, authorities here hope to identify arson-for-profit conspiracies in their early stages and abort the crimes before they result in costly and possibly fatal fires.

Proponents claim the Hews computer could pinpoint potential arson targets with almost 90% accuracy, and Garneau estimated the system could cut the city's arson rate by 40% to 50% if effectively deployed.

Garneau has written and sent grant applications for the system to several federal agencies, including the Department of Housing and Urban Development, the National Fire Prevention and Control Administration (NFPCA) and the Community Services Administration.

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Small Machines, Big Places — Part 2

Most Users Still Leery of Distributed Processing

By Esther Surden
CW Staff

WALTHAM, Mass. — Although a few pioneers are starting to use distributed processing techniques to shape their networks for optimum economic and managerial advantages, most users are very skeptical of distributed processing.

That conclusion was drawn by International Data Corp. (IDC), a market research firm here, after it surveyed 30 directors of management information systems (MIS). In a recently issued report on its findings, however, IDC cautioned that its sampling of MIS directors had a built-in bias because "much of the pressure pro and con [about distributed DP] is evolving from the non-DP management structures of these organizations."

Those users who are attempting to distribute their processing are introducing masses of "uninitiated employees" to computers and "often times bucking the natural bent of upper management to stay with IBM's prescribed data processing blueprint," the study noted.

Entitled "Minicomputers: The Impact on Large Organizations," the report said distributed processing will continue to develop over the next 10 or 15 years, although mass production operations will "remain appropriate" for many standard applications.

Transaction or event-driven applications will "drive the move toward distributed processing," the report forecast.

The report warned, however, that many users will find the complexities of computer/communications networks too "cumbersome" to attempt.

Tripartite Definition

After talking to the MIS directors, IDC came up with a three-pronged definition of distributed processing.

First, distributed processing involves a network of processing nodes, with each node dedicated to a specific organizational unit. Although the nodes are generally linked through communications hookups, IDC believes that "in some cases other forms of data transfer — media transfer, for example — are appropriate."

Secondly, a single data base is distributed throughout a distributed processing network and is stored, updated and accessed at specific nodes with minimal redundancy.

The third feature of distributed processing is some degree of central control, required to maintain "order and some logical flow" among the units.

Transportation and retail firms are spearheading the trend toward distributed processing, according to IDC. A railroad, for example, would use the concept to automate yard operations.

"As trains arrive at a yard, the host computer is notified and then assigns each car to a new block, based on the next destination in its route," the report explained. Local minis then pick up the operation, assigning tracks and keeping inventories of car locations as well as producing work assignments for the crew.

Retail chains are implementing distributed processing with their point-of-sale systems, allowing local store systems to track sales audit, inventory and merchandise control data and to provide buyers and managers with the information they need.

Those industries that are presently using distributed processing techniques justify the use for economic reasons. "Communications costs ... can be minimized by installing processor power at end-user sites," the survey showed. In addition, people costs could be reduced, the report added.

"The real driving force for this trend will be managerial accountability," IDC said, noting "hard justifications" in many cases "have followed rather than preceded the actual decision to pursue the distributed processing route."

When justifying distributed nets, "users have become more sophisticated," the report continued. Those surveyed normally analyzed the cost of at least two different approaches to the same problem — expanding the central site to accommodate a terminal-oriented application and distributing the processing.

"Such analysis took the form of cost per transaction, return on investment and many more," IDC said.

Four ingredients commonly made a company a likely user of distributed techniques, IDC found. First, the firm had a new application requirement of an operational, not administrative nature.

Secondly, the present DP organization was operating at near capacity so that implementation of this application would require expansion at the central site.

Further, the application usually posed a situation in which about 80% of the processing and data base requirements were self-contained at a local site, generally the source of that application's data.

Lastly, a pioneering, risk-oriented individual usually pushed for the concept and oversaw its implementation. That same person sometimes bucked a difficult political situation, with management against the approach.

An Inevitability

WALTHAM, Mass. — Distributed processing is inevitable.

That's what International Data Corp., a market research organization here, predicted in a study called "Minicomputers: The Impact on Large Organizations."

"Users are smarter than they used to be," the report said. "They have become more analytical in their approach to data processing costs. And one by one they will begin to follow the role of distributed processing."

There are several reasons for this, according to IDC. First, distributed processing takes DP out of the category of overhead items and allows management to appropriately allocate costs to various departments.

Secondly, traditional DP applications have been administrative in nature, but new applications will "impact the very heart of business applications." Distributing the processing allows remote locations to operate even if one system is down.

In addition, most applications, when weighted against alternatives, will prove more economical in the distributed mode. "Communications costs tend to be lower and people savings can be significant," IDC said.

IBM will also give its blessing to the concept, the report forecast, enabling the "whole evolution to pick up steam."

Distributed processing will have the impact "of a second industrial revolution," IDC believes. With millions of people having first-hand contact with computers as tools for their everyday work, more ideas for using those tools will be generated.

"The result may well be a sigificant change in ways of doing business as well as in our very life styles," the study predicted.

'Waves' Ready Next Month

NEW YORK — *The Waves of Change*, a book that *Computerworld* finished excerpting last month [CW, Oct. 17], is expected to be off the presses and ready for shipment in December.

Authored by Charles P. Lecht, president of Advanced Computer Techniques Corp. (ACT), the book will be published by Rhode Island Lithograph, ACT's printing/publishing subsidiary.

The price per copy will be $39.75 including postage and handling. Preference will be given to prepaid orders, ACT noted.

Orders for the book can be placed through Carl Menkel at ACT, 437 Madison Ave., New York, N.Y. 10022.

Kao Awarded Medal For Fiber Optics Work

NEW YORK — Dr. Charles Kuen Kao, a staff scientist with the International Telephone and Telegraph Corp. (ITT), has been awarded the Franklin Institute's Stuart Ballentine Medal.

The gold medal, which is awarded for outstanding achievement in the fields of communications or reconnaissance that employs electromagnetic radiation, was given to Kao for his research in optical fiber transmissions.

Kao received both his B.S. and Ph.D. degrees in electrical engineering from the University of London. He was presented with the 1976 Morey Award for outstanding contributions to glass science and technology.

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Nolan Sees Most DP Managers Staying in DP

By Debra Loomis
Special to CW

LEXINGTON, Mass. — More DP managers are going to remain in data processing than continue to climb up the management ladder, according to Dr. Richard Nolan, chief executive officer of the DP Management Co. and former associate professor at the Harvard Business School.

"Good DP managers are in high demand by major companies," Nolan said in a recent interview here, "and many DP managers don't want to move out of data processing at all; they enjoy the continual technical challenge."

DP managers are typically locked in DP jobs by top management even if they want to change. Nolan believes that by the time a DP manager is ready and able to move into other areas, for the most part he is lacking in the skills necessary to join senior management.

Technical Background

"DP managers have a strong technical background, but most haven't gone through any sort of company training program in the areas of marketing or finance, for example" Nolan stated. He feels it is necessary for the manager who wants to move up through the ranks to find a mentor within the company who will work with him.

"Today, if a young person knows that he wants to obtain a data processing background and then move on, I would advise him to enroll in a good technical undergraduate program and then obtain the necessary management skills in an MBA program," Nolan recommended.

Nolan pointed out that certain companies are advancing DP managers, and some are going on to vice-presidencies. "John Deere, Celanese and Xerox are promoting data processing people from within," he noted. "Celanese and some of the larger insurance companies like Aetna and Massachusetts Mutual have former DP managers as vice-presidents. And United Airlines has a former DP manager as president of one of its subsidiaries."

High Turnover Rate

In a recent 12-month period, 25% to 35% of DP managers in more than 450 companies were replaced, according to a survey conducted by a major vendor of computer hardware and software in 1975. These rates compared with 10% to 15% turnover rates among other senior managers.

According to Nolan, the remedy for this manager's plight is a closer and more sympathetic collaboration between him and top management.

In a 1973 article in the *Harvard Business Review,* Nolan wrote that "top management mishandles this key individual in many ways: it fails to recognize the fact that he needs to be at least as much a manager as a technician; it usually regards his job as a dead-end from which no promotion is possible, it tends to use him as a scapegoat when things go awry.

"On the other hand," he continued, "the DP manager is too often unaware that the computer applications he develops create waves that disrupt the old operating patterns of the organization.

Agent of Change

"He should be conscious that he is an agent of change — he should make sure that his department's innovations are designed to mesh with company operations as smoothly as possible and he must also make strong efforts, as a manager, to damp down whatever disturbing reverberations are unavoidable."

These problems still exist, he indicated. To function effectively, the DP manager must have a good understanding of his company, its capacity for change and its competitive environment, Nolan said.

To some extent, he believes, the magnitude of this job is being recognized. A number of companies with sophisticated DP activities have created a vice-presidency for the DP manager; others, with a lower level of activity, have the DP manager report to an executive vice-president or a service-oriented vice-president.

"By failing to provide the DP chief with a managerial career path," Nolan said in the same article, "top management is freely squandering its very scarce resource of managerial talent."

It is Nolan's belief that top management has a responsibility to treat the DP manager as a permanent, bona fide member of the management group, to evaluate his performance properly and to provide him with a career path.

Deadline Approaching For IIA Auditing Test

ALTAMONTE, Fla. — Jan. 31 is the deadline for registering for the annual certified internal auditor examination offered by the Institute of Internal Auditors, Inc. (IIA).

This will be the last opportunity for candidates without a baccalaureate degree or its equivalent to register for the exam, which is scheduled for May 18 and 19, an IIA spokesman said.

"By registering for the May exam and taking at least two parts this year, candidates without degrees will have five years to successfully complete the four-part exam," the spokesman noted.

Additional information about registration is available from the Certification Department IIA, 249 Maitland Ave., Altamonte Springs, Fla. 32701.

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EPA System Aimed at Preventing Oil Spills

By Tim Scannell
CW Staff

WASHINGTON, D.C. — The Environmental Protection Agency (EPA) is using a large mainframe with a commercially produced, generalized data base management system (DBMS) to help prevent oil spills.

Information about such spills that is generated through analysis of file contents helps the EPA develop and dictate regulations that make oil handling less harmful to the environment.

The System 2000 DBMS from MRI Systems Corp., running on an IBM 370/168, maintains a file on both onshore and offshore facilities (within three miles) that are under the responsibility of the EPA. Included in the file are facilities that drill, produce, gather, store, process, refine, transfer, distribute or consume oil. This includes more than 15,000 inspections and 6,000 oil spill reports for a population of more than 100,000 facilities, the EPA said.

The file details the safeguards, hazards and general condition of each site. If a spill does occur, that information, including cause, location, amount, type of oil and area of the spill, is also added to the file. It is on the basis of a file's content that the EPA dictates its preventative measures.

The EPA records the causes of oil spills such as this in its information management system in an attempt to prevent future accidents.

A Spill Prevention, Control and Countermeasure (SPCC) plan is required to be implemented at any non-transportation-related facility. that could reasonably be expected to spill oil into the waters of the U.S. This plan is prepared by the owner or operator and must be certified by a registered professional engineer. The EPA conducts surprise inspections of facilities to determine if these plans have been prepared, certified and implemented. This information is also stored in the System 2000 data bank.

Since the System 2000 has been implemented, there has been a significant drop in the number of spills, the EPA said. In the area that includes Colorado, Montana, North Dakota, South Dakota and Wyoming, for example, there was a 58% reduction — from approximately 60,000 gallons to 30,000 gallons — in the number of non-transportation-related spills.

The EPA maintains personnel in 10 regional offices who travel to major spill sites, supervise clean-up operations and gather information to be batched and processed through the computer. Not only does this information help the EPA determine better methods of preventing spills, but it has also aided the agency in defending its own regulations in the courts.

Potential Abuse Seen Alarming

By Esther Surden
CW Staff

SEATTLE — Universities are producing great numbers of well-educated potential computer abusers, David Brandin, director of the information science library at SRI International, said at a conference here recently.

An "alarming growth" is taking place in the number of people who have the skills to abuse computers.

"The universities and professional societies don't help the situation. They compound our problems," Brandin said. Students are taught computer skills but not ethics and law. Further, the professional societies do not even have enforceable codes of ethics, he added.

In the university setting, it is not unusual for students to play pranks with the system or steal computer time to run off a Snoopy calendar or play games. These activities "encourage more serious crimes," he contended.

It will take years before the country can "cope with the problem of growing abuse," he continued. To do so will require a "massive change of market consciousness" — a change that will have to start at the university level and with pressure from professional associations, Brandin said.

Presently, the Association for Computing Machinery (ACM), is looking at a proposed enforcement policy for a code of ethics, he continued.

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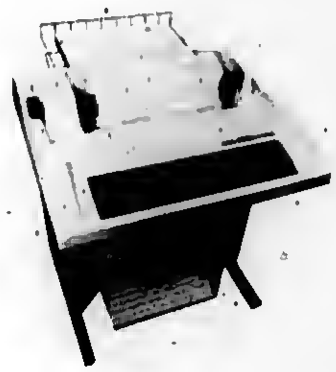

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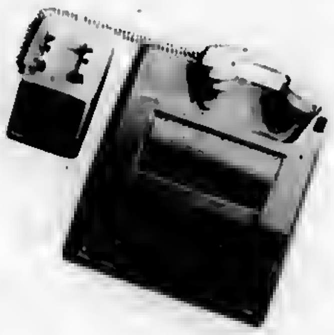

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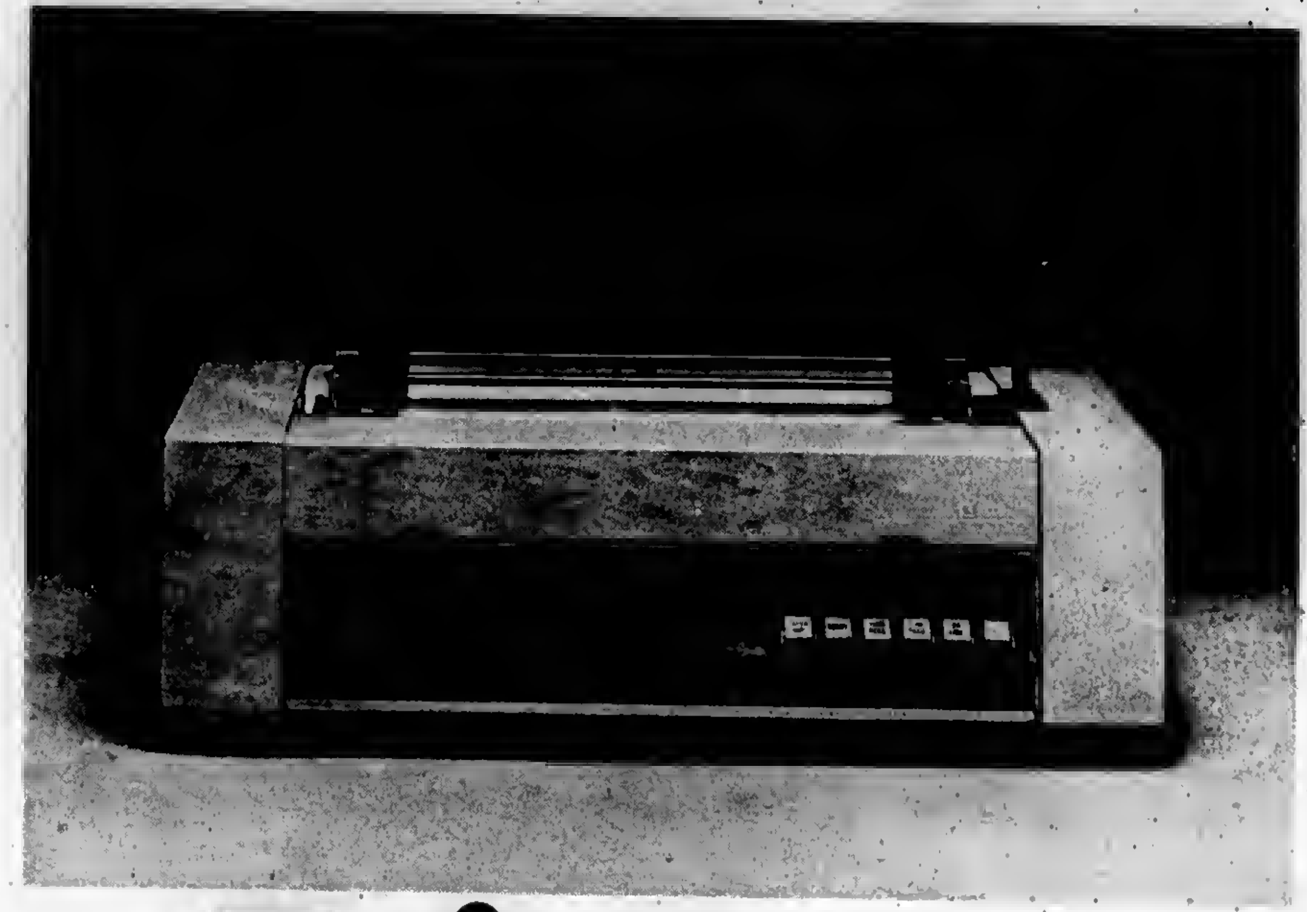

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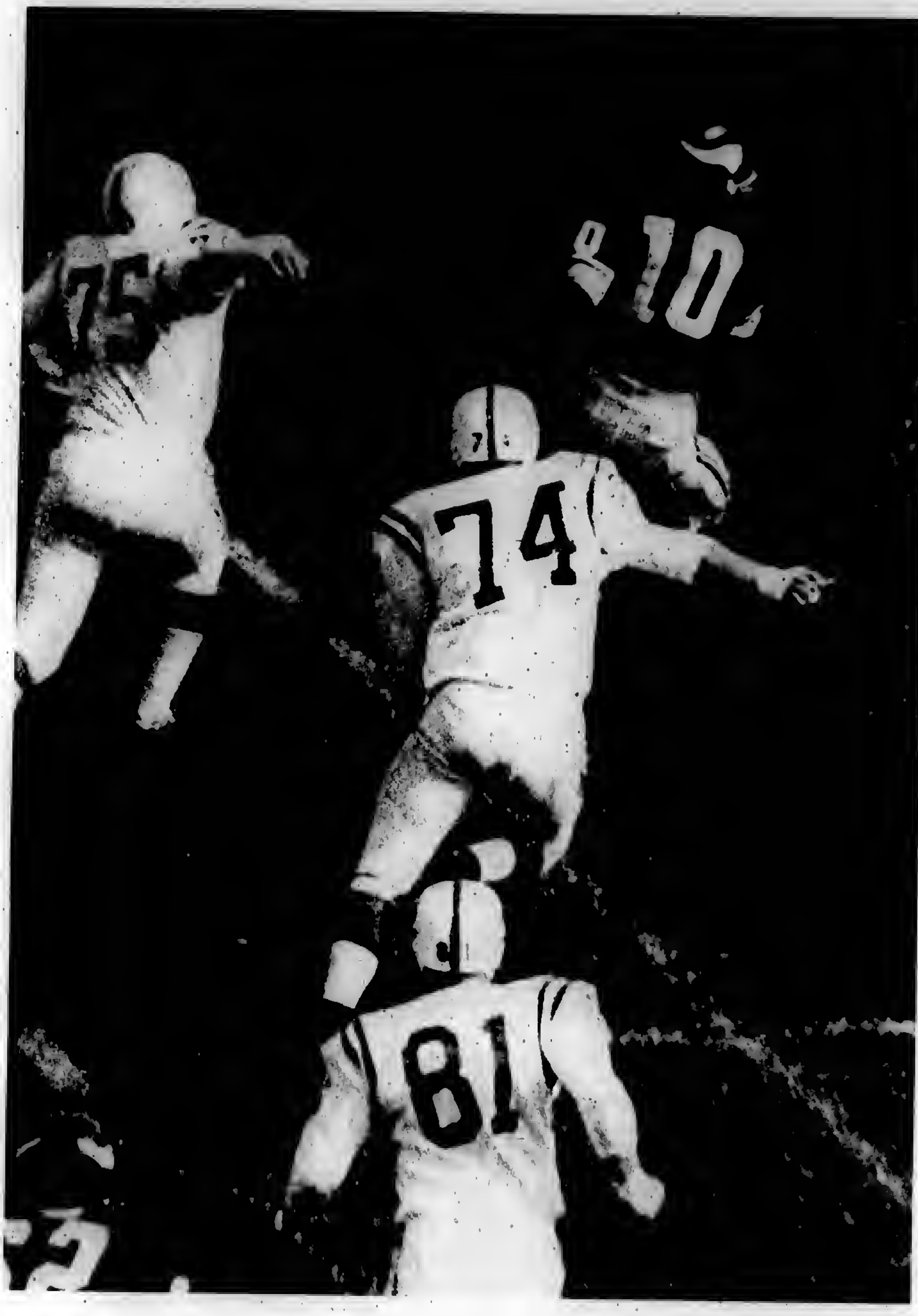

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Distributed DP Viewed Concept, Not Product

By Molly Upton
CW Staff

NEW YORK — "Distributed data processing is a concept, not a product," Jean-Michel Gabet, staff associate at Gnostic Concepts, Inc., said in chairing a session on using minis to replace mainframes at a recent conference here.

Perhaps one reason the term "distributed DP" (DDP) has so many definitions is that users are designing DP structures to suit their various corporate needs — an approach recommended by two speakers, Art Conover, vice-president of systems planning and programs for Honeywell Information Systems, Inc., and Jon Gould, vice-president of securities processing systems development for Citibank N.A.

Regardless of whether the DP structure is going to be distributed, the user should set it up to suit his needs rather than accept any specific plan of a vendor, they indicated.

Gould, who described systems with no data bases, said the need for data bases arises from the DP department's ignorance of what information management is going to want. Consequently, the DP department keeps track of everything, he said.

An advocate of distributed data bases, Conover pointed out that generally 90% of a firm's transactions involve only 10% of the data base. Response time problems stem not from CPU performance, but from access to the data base, he said.

Although Conover and Gould come from mainframe and mini backgrounds respectively, they agreed the decreasing price of technology facilitates the acquisition of more DP gear in order to implement efficiency within an organization.

Keys to Technology

In describing the various types of distributed data processing architectures, Conover emphasized that user requirements and changes in technology are the keys to future architecture.

Vendors have responsibilities to work with the users in designing the systems and should provide a broad range of flexible architectures that will facilitate protection of investment, he said.

They should also offer tools and utilities that make the system easy to use, he added.

In addition, vendors must make systems so reliable that the user thinks of them as he does a utility, such as a light switching on.

At Citibank, Gould turned to minis and micros to solve a problem that didn't stem inherently from the DP department.

Citibank has decentralized its corporate banking services processing as a means of offering good service while keeping the corporate budget flat and rendering the bank's costs insensitive to growth in volume of transactions, he said.

The bank's labor costs were $115 million, up 18%; other costs were $115 million, up 15%; and DP was $10 million, up 13%.

Since 1969, the Citibank staff has been reduced from 10,500 to less than 4,000 today, he said. The operating budget has remained flat, costs have gone down and the difference has financed depreciation of all DP gear and software development, he said.

However, Gould said the decentralized mini approach could not claim all the credit for the flat budget and the reduction in staff. The bank initiated an extensive "industrial engineering" type of examination of people's productivity within the bank at about the same time the decision was made to substitute capital equipment for labor, he explained.

As an indication of overhead, Gould said the bank had staffs for both the DP and user departments who served to "fire hand grenades at each others' walls."

If the bank had not taken the industrial engineering approach or instituted decentralized minis, its current operating costs would be about $400 million, Gould estimated.

Gould, an ardent fan of minicomputers and former employee for Interdata Corp., said one has to change his mental set and think of a mini as a telephone, an item that does not have to be kept busy to justify its expense, rather than a factory, which does.

Currently users tend to balk at using a mini because their criteria include such considerations as the largest single job to be run, regardless of its frequency, and the number of transactions per unit of time, Gould said.

Another means of determining what size system is needed is to give a project to two people for estimates of time and size, Gould recommended. One person should be oriented toward large machines and the other toward tiny machines. The differences will be astounding and the "success ratio will go up exponentially."

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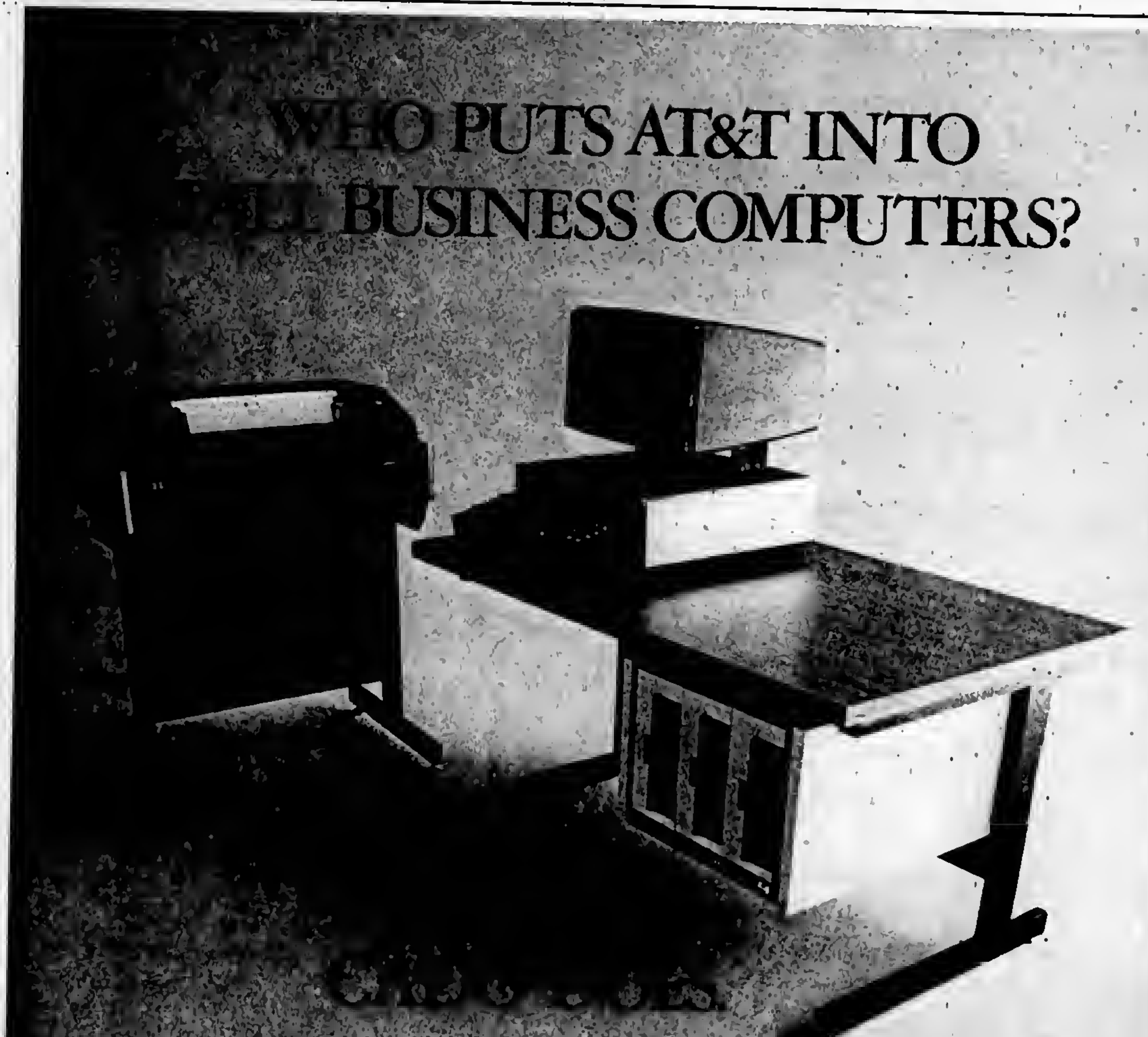

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Seen Compounding Problems

DDP Users Warned on Remote Development

By Molly Upton
CW Staff

NEW YORK — Users who move from a central DP operation to a distributed system with a distributed data base and then attempt to do development work at remote sites will only compound the difficulties they may already have in controlling their DP operations, according to Gene Altschuler, principal of Peat Marwick, Mitchell & Co.

Speaking at a recent conference here, Altschuler said users must deal with their organizational structure in parallel with technical developments rather than overlaying an inappropriate technical structure on their companies.

Mel Blitz, vice-president of advanced technology for Corporate Technical Planning, Inc. indicated people and organizations — not technical issues will be the dominant problems that users will face in data management.

In many cases users have had little success in effectively integrating a data base administrator (DBA) into the organization, he indicated.

However, Frederick H. Miller, assistant vice-president for The Equitable Life Assurance Society, described how his firm minimized such problems by carefully structuring interaction of the various DP components.

The problems associated with distributed development involve control, advice and monitoring, Altschuler said. In many instances, the person responsible for systems development in the remote sites is isolated from the central environment and operates in a user-driven environment.

The person feels that his fate will be determined by the user-manager, often a plant manager with day-to-day concerns.

In order to remedy the DPer's isolation from his peer group, a company should try to facilitate meetings so he can have a better sense of what is happening in DP throughout the corporation, Altschuler said.

Another problem is that of training, education and replacement for the DBA. Ideally there shold be a capable backup to the DBA at the same site, but usually if the standby is good, he leaves, he said.

A problem to which Altschuler also had no answer is that of control so synchronization can be achieved.

Despite the problems, the economic viability of DDP is convincing and the trend toward distributed DP should accelerate dramatically, Altschuler indicated.

Decentralized Development

Miller, who is manager of the data assurance division at Equitable, said his corporation has central processing and decentralized development.

The Equitable organizational approach has several names, including collateral management, matrix organization and staff guidance. With this structure, there are interfaces at various levels and across company lines, such as user groups for various data bases, Miller explained.

Equitable's commitment and dependency on DP is sizable. The DP budget is 12.5% of the firm's expenses, and 60% of this goes for development and 40% for operations.

The DP budget for 1977 was $51.5 million. There are over 500 on the staff for operations, 425 for development and 110 performing technical support.

The firm has three IBM 370/168s and over 300 minis, along with 4.5 billion bytes of disk and 28,000 active tape reels.

Separate Development

Of the five major operating areas within the firm, each has its own systems development staff except the corporate sector. The size of these staffs ranges from six people to over 400, Miller noted.

Under corporate computer services, the data and systems assurance group handles data administration, quality assurance and DP standards.

The data administration's responsibilities include both policies and functionality of the system, he said. It ensures that policies regarding data are in line with corporate objectives and needs and that the overall system can be efficiently used.

Furthermore, it concerns itself with data protection, data base environment and application opportunities. The group sets policy on privacy matters, works with internal auditors and keeps abreast of privacy legislation, Miller said.

It also attempts to relate future technology to future needs and to influence vendors to provide what Equitable needs. In addition, it investigates what features end users might like from the data bases and provides a liaison with users and systems planning groups, he added.

The group interfaces with the data base coordination group, which is the front-line troop for authority to access, housekeeping and control for the IMS data base, he stated.

The data base design group assists developers and reviews all changes.

Another control point is the data dictionary support group, he indicated.

The principal interaction of the data base administration group with the systems development areas is through the DP policy committee, which is chaired by the senior DP person, his representatives and the heads of systems development areas, Miller said.

The policy committee reviews user requests to ensure they are consistent with institutional plans and also facilitates DP staff reassignments. This latter function helps prevent the loss of expertise from the company, he indicated.

Data base user groups transcend various lines in the corporation and involve both the systems developers and user organizations. Sometimes this can be difficult if the system developers aren't on good terms with the users, but generally things have worked well, Miller said.

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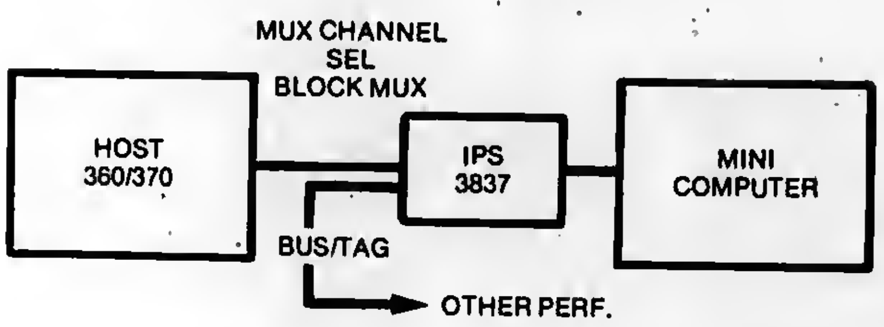

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Lecht: Dispersing DP Means Distributing Incompetence

By E. Drake Lundell Jr.
CW Staff

MUNICH — "Incompetence contained in the data center is better than distributing it throughout the organization," an American consultant and author told the recent Systems 77 conference here.

Charles P. Lecht, president of Advanced Computer Techniques, Inc., said one of the greatest problems with distributed DP (DDP) is the fact that a typical organization does not have enough people to do the programming and run the dispersed systems.

Because of the people and organizational problems it causes, Lecht predicted DDP "will fade" as a concept and warned users to go slowly in implementing dispersed systems. Three reasons are often given for moving to distributed processing, according to Lecht:

- Centralized DP has failed.
- Distributed processing is cost-effective.
- Users want to change or just try something new.

But, he indicated, the waves of change in the compter industry are changing most of the old equations.

For example, main memory in large quantities is now becoming available at low prices, a factor that he said will argue for recentralization. Falling prices for large systems and more effective programming techniques could also make central DP more effective, he hinted.

At he same time, Lecht said, it has not been proven that DDP is more cost-effective. In fact, he indicated, with the additional manpower needed to program and operate the distributed centers, the distributed concept could be more expensive — even if the people were available.

Finally, he indicated that IBM is resisting DDP and this could hold back the field. Lecht described the IBM positon by asking, "If God had wanted distributed processing, why didn't he put a brain in the wrist?"

Jain Gains Honor

BUFFALO, N.Y. — Dr. Anil K. Jain, an associate professor of electrical engineering at the University of New York at Buffalo, was recently given an award for his development of computer picture-coding techniques.

Sponsored by the National Science Foundation to present a paper at the International Picture Coding Symposium in Tokyo, Japan, Jain and his associate, Sheng H. Wang, a student, were awarded two first prizes.

Jain's transmission method, termed Adaptive Hybrid Coding, allows pictures to be transmitted by coding the information so each bit of data transmitted contains as much information as possible.

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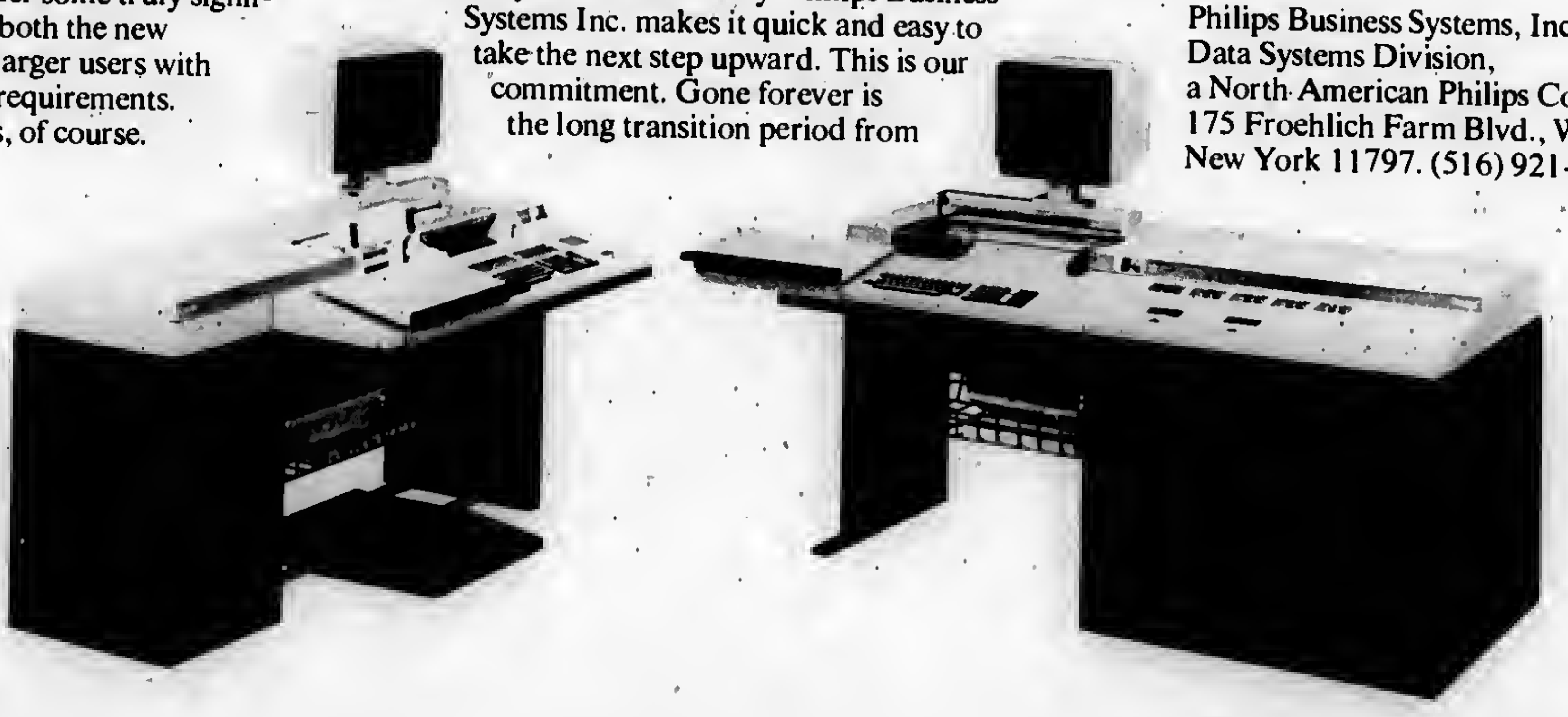

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Disinterest Seen Snag in Professionalism Quest

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — Gaining professional status for data processing personnel is difficult enough without being compounded by the fact that so few people are interested in the problem.

This view was expressed at a Data Processing Management Association (DPMA) Info/-Expo '77 session here recently attended by only 20 people.

John Salasin, a group leader with Mitre Corp., observed that there are two aspects to professionalism: competency and responsibility.

Individual responsibility is inhibited by six factors — the values of the organization for which one works; the resistances of the individual borne out of the fear of losing his job; lack of information; lack of resources; obligations; and the benefits gained by acting irresponsibly, he said.

To foster responsibility, Salasin suggested that one person in an organization be identified as the person ultimately responsible for a project. That person should take affirmative action in learning the rules, specifying the penalties if those rules are broke, taking adequate security precautions and maintaining accurate and timely data.

Donn Parker, a senior management consultant with SRI International, took a different view.

Parker, who is currently involved in laying the foundation for a professional code of ethics, switched the emphasis from methods an organization could use to ensure professionalism to the behavior of the individual.

Before any kind of code can be written, "unethical conduct" must first be defined. "Almost every keynote speaker mentions professional conduct, but that is putting the cart before the horse," Parker said.

The consultant developed a series of scenarios portraying different types of behavior for presentation last year to a workshop whose participants judged ethical and unethical behavior. The results of that workshop will be published by the American Federation of Information Processing Societies this year, he indicated.

Parker presented three of those scenarios at the session here and got very similar results, he said.

The first scenario described a programmer who developed a program of great value to his employer, then quit and went to work for a competitor. He gave a copy of the program to his new employer, who used it.

Seventeen session attendees found the programmer's behavior unethical, three thought it was not unethical and two saw no ethical issue involved.

At the National Computer Conference last June, Parker presented the same scenario; 130 thought it unethical, 61 not unethical and 13 said no ethical issue.

The large number of voters for the second option could be attributed to the probability that there were more programmers at the NCC session than there would be at a DPMA conference, Parker said.

Alan Taylor, consultant and contributing editor to *Computerworld* changed the scenario by adding that what the programmer was doing was clearly illegal. With that qualification, nearly everyone voted that the behavior would be unethical.

"The fact is that we already have ethics . . . we do not perform illegal acts or condone them," Taylor said.

The illegality of certain acts already forms a constraint on behavior, but not even that standard has been universally recognized by the industry, he said.

"Rather than trying to find the ultimate code of ethics, we can take the simple one, but no one has taken even this simple step," he complained.

'There is no decent road map or even a sense of urgency" from within the industry to establish a code of ethics — all the pressure comes from outside. It is not being done because of apathy, he said, pointing to the sparse attendance at the session to illustrate his point.

Joan Shields, director of systems support for the Air Force data center, brought the emphasis back to what actions could be taken by an organization to ensure the professionalism of its employees.

There must be a "commitment to excellence" by the organization, Shields said.

"The organization must encourage the individual through constant learning" such as training sessions and literature, she said. Management is responsible for the development of professionalism in any organization and individual commitment matters little if management isn't also committed, she added.

Calendar

Nov. 15-17, Tokyo — **Semicon/Japan.** Contact: Semicon, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

Nov. 30-Dec. 2, Newport Beach, Calif. — **1977 Chief Executives Conference: Positioning Your Company for The Future,** sponsored by the International Business Forms Industries, (IBFI). Contact: IBFI; 1730 N. Lynn St., Arlington, Va. 22209.

Dec. 1, Palo Alto, Calif. — **California Computer Show.** Contact: Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

Dec. 5-7, Washington, D.C. — **Computer Contract Negotiation.** Contact: Ruth Dargis, ACT-Brandon Co., 437 Madison Ave., New York, N.Y. 10022.

Dec. 6, New York — **The Impact of Personal Computing on Traditional DP, Communications and New Markets.** Contact: Carolyn Mathews, Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138. The same seminar will be held Dec. 9 in Anaheim, Calif.

Dec. 6-7, Washington, D.C. — **Workshop on Reducing Software Complexity,** sponsored by Infosci. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Dec. 7-9, Las Vegas — **Data Processing Security: The Total Corporate Approach,** sponsored by Data Processing Security, Inc. Contact: Jon Allen, Program Director, 235 N.E. Loop 820, Hurst, Texas 76053.

Dec. 7-15, Moscow — **Sovexpo 77.** Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Dec. 12-14, Chicago — **Management Information Seminar on Minicomputers,** sponsored by the University of Chicago Center for Continuing Education. Contact: Heidi E. Kaplan, Department 14 NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Dec. 12-14, Los Angeles — **Seminar on Data Processing Operations Management,** sponsored by the University of Chicago Center for Continuing Education. Contact: Heidi E. Kaplan, Department 14 NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

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EIGHTH INTERNATIONAL SYMPOSIUM ON FAULT — TOLERANT COMPUTING. Toulouse, France, June 21-23, 1978.

The emphasis of the conference will be on the system approach and on the interaction between technological advances and fault tolerance. Suggested topics include hardware and software architecture of fault-tolerant systems, testing for quality production and error recovery and system reconfiguration.

Summaries of 200 words are due as soon as possible and 4,000-word paper propositions are due before Dec 1. They should be in English and sent to M. Diaz, FTCS-8 Program Committee Secretary, L.A.A.S., 7, Ave. du Colonel-Roche, 31400 Toulouse, France.

EIGHTH ANNUAL SYMPOSIUM ON AUTOMATIC IMAGERY PATTERN RECOGNITION, Gaithersburg, Md., April 3-4, 1978.

Emphasis will be on the application of image pattern recognition techniques to new industrial and commercial uses, in addition to military applications. In special demand are papers that bridge the gap between technical developments in image pattern recognition and industrial and commercial needs.

Suggested topics include segmentation and scene analysis, change detection and matching and transforms and filters. Suggested new areas of application include pulp and paper manufacturing, measurement instruments, agriculture, biomedical analysis and forensic sciences.

Extended abstracts should be sent by Nov. 15 to Leslie Santacreca, Electronic Industries Association, 2001 Eye St. N.W., Washington D.C. 20006.

FOURTH INTERNATIONAL CONFERENCE ON DIGITAL SATELLITE COMMUNICATIONS, Montreal, Canada, Oct. 23-25, 1978.

The conference will address all aspects of digital communications via satellite for the provision of international, domestic and specialized services; their relationship to terrestrial systems; and new developments in digital technology and techniques for voice, image and data processing.

Suggested topics include spectrum and orbit utilization, integration of ground and space segments, echo control techniques, RF equipment in ground and space segments and economic analysis of new applications and services.

Four copies of a 1,000-word summary for a proposed paper should be sent by Dec. 1 to Manager of Administrative Office, The Fourth International Conference on Digital Satellite Communications, Teleglobe Canada, 680 Sherbrooke Street West, Montreal, Canada H3A 2S4.

FIFTH ANNUAL CONFERENCE ON COMPUTER GRAPHICS & INTERACTIVE TECHNIQUES, Atlanta, Ga., August 23-25, 1978.

Papers are requested dealing with any innovative approach to graphics. A 500 word abstract should be sent by Dec. 2 to Prof. R.L. Phillips, 213 Aerospace Engineering Building, University of Michigan, Ann Arbor, Mich. 48109.

15th DESIGN AUTOMATION CONFERENCE, Caesars Palace, Las Vegas, Nev., June 19-21, 1978.

The conference will emphasize the use of computers as aids in the design process.

Areas of interest include design verification, simulation, layout, documentation and software engineering. Application areas of interest include DP design in an LSI environment as well as other design areas, such as architecture, ship building, aerospace vehicles and software designs.

Three copies of a preliminary paper should be sent by Dec. 9 to Robert J. Smith II, Lawrence Livermore Laboratory, P.O. Box 808, L-156, Livermore, Calif. 94550.

SOUTHEAST ASIA REGIONAL COMPUTER CONFERENCE, Manila, Philippines, Sept. 4-8, 1978.

The conference will be primarily aimed at enhancing international sharing of computer technology and regional exchanges of applications for national development. Suggested specific topics include progress in electronic technology, advanced programming techniques, national policies on the application of computers for development, computer selection and evaluation and computers in natural resources development, in national health programs, in human settlement and in engineering.

Four copies of a manuscript no longer than 2,500 words, accompanied by a 100-word abstract, should be sent by Dec. 20 to Dr. P.F. Baredolden, c/o Philippine Computer Society, MCC P.O. Box 950, Makati, Metro Manila, Philippines.

1978 SUMMER COMPUTER SIMULATION CONFERENCE, Newport Beach, Calif., July 24-26, 1978.

The theme will be "Simulation Today." Suggested areas for papers include digital and hybrid simulation systems and application areas such as energy conservation and utilization, aerospace, chemistry and the emerging simulation languages.

Two-to four-page summaries should be sent by Jan. 1 to Dr. Ralph C. Huntsinger, 1978 SCSC Program Chairman, Computer Science Department, California State University-Chico, Chico, Calif. 95929.

With Minimum Disruption of Flow

Australians Favor International Privacy Accord

By G. Russell Pipe
Special to CW

SYDNEY, Australia — An international agreement specifying privacy protection guidelines and at the same time minimizing disruption to transborder data flow is favored by the Australian Law Reform Commission and the DP Division of the Australian Public Service Board.

"There are to be significant increases in the scope of government transborder data applications," according to P. Morgan, head of the DP division, "which raise privacy and security considerations." At the present time, the amounts of data transmitted or received from overseas are not significant, he stated recently. "Actually, there is much more data flowing in and out of the country on magnetic tape media than via telecommunications."

This includes an interchange of data on world trade statistics supplied to and received from the United Nations, the General Agreement on Tariffs and Trade (Gatt), the European Community and data relating to international patents, meteorology and cartology.

Government departments transfer outside Australia data relating to defense inventory and supply systems such as computer-based retrieval of medical abstracts.

In the future, Moran indicated, a network utilizing Department of Foreign Affairs switching centers in Canberra, London and Washington will be employed for immigration, treasury, trade and customs functions.

As the data being transmitted increases in value, government departments will become more dependent on the smooth passage of data for satisfactory administration in overseas areas, Moran stressed. The present national networks facilitate a greater exchange of data domestically for customs, health insurance, pharmaceutical benefits, pensions, education, taxation and statistical programs and could have an impact on flow abroad, he added.

Government Guidelines

The practice of utilizing overseas-based time-sharing systems is increasing in Australia, largely for reasons of economy. The advantages of foreign services in comparison with locally available facilities, Moran cautioned, should be carefully evaluated in choosing such bureaus.

Guidelines were issued to government departments in 1975 calling attention to the need for high security standards and to "potential problems which could arise in extreme circumstances.'" This might arise from disputes or conflict of interest between users and bureau management, "possibly leading to withholding of the user's data or denial of access to facilities.

"Such situations might be complicated by the difficulties posed by recourse to law in the overseas country and subsequent embarrassment to the Australian government," the guidelines said.

"Satisfactory continuity of service and the adequate protection of data in all circumstances are far more difficult to obtain under these conditions," they continued.

The guidelines also express a concern that by using overseas service bureaus, government departments could be affected by the financial stability of the services, industrial unrest, political decisions or national emergencies in the overseas country, "all of which are largely beyond the control of the remote user."

The Australian Law Reform Commission was charged in 1976 by the Commonwealth Attorney General to investigate and report on the legal protection of privacy in the private and public sectors. "This is the first attempt in Australia to approach protection of privacy in a comprehensive way," G.E. Brower, secretary of the commission, said.

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(Continued on Page 22)

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Political, Economic Impact

Information Discrimination Seen Effect of Technology

By Kathleen Quinn
Special to CW

ATLANTA — "Information discrimination" and "cross-subsidies" are two side effects of the electronics age that have some serious social and political implications for all levels of society.

We now have individuals, organizations and nations that are either "information-rich" or "information-poor," according to Ronald S. Eward, president of MarTech Strategies, Inc., who spoke at a recent conference here.

As an example of the information-rich, Eward cited the 10 R&D firms that worked on the National Aeronautics and Space Administration's (Nasa) space program. That project led to development of semiconductor technology, which these firms have marketed exclusively and very successfully.

The value of that information cross-subsidy was enormous, according to Daniel O'Neil, assistant director of the Office of Telecommunications Policy (OTP). Since no one has yet defined a standard for the value of information, this "government subsidy" cannot be calculated.

Another problem inherent in the "information society" is the potential for the information-rich to control and repress those with less information.

The politics of information are inseparable from the economics of information, according to Eward. Therefore, since large cross-subsidies such as the one given to the R&D outfits by Nasa are bound to lead to a greater concentration of wealth and power, control and repression of the society by the "information-rich" can result. "And the probability of a favorable outcome is no better than that of an undesirable outcome," Eward added.

Boundaries Blurring

"A third impact of the electronic age will be the blurring of institutional boundaries," Eward said. The computer/communications area is an example of two previously distinct markets that are no longer easily separated.

Electronic banking, retailing, journalism, securities, credit, etc. will pose similar problems in defining their market boundaries.

Although these warnings appear bleak, Eward also predicted that the thrust of electronic technology will be a major human-rights concern during the next 20 years, as public awareness of the technology and information transfer explosion grows.

"The need for a national information policy is great," according to Eward, who has just completed two years of work on an OTP study, "The Information Society in an Electronic Age."

Whether this policy will be simply a restructuring and synthesis of policies presently in effect at the several information commissions or whether it will be something "fundamentally different" is as yet undecided. This decision must be made by the new Assistant Secretary of Commerce for Communications and Information, a post recently announced by President Carter, Eward added.

The fact that creation of this new post will give the U.S. Department of Commerce control over the national policy is preferable to trying to decide on a policy in the midst of the "three-ring circus" that existed previously, according to O'Neil.

However, there is some doubt about the neutrality of the government as developer and administrator of this policy, O'Neil said. The government's expenditure on information services for scientific and technical purposes alone was $2.8 billion last year. The total value of information services rendered to the U.S. is probably incalcuable, O'Neil added.

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Newkirk Calls Motivation Real Job of DP Managers

By a CW Staff Writer

NEW YORK — A manager is someone who gets things done through others, according to Nate Newkirk, president of NGP Associates, Inc., a one-man consulting firm.

Managers have four functions: planning, controlling, organizing and directing, he said.

The manager must motivate — or take action that causes an action, either positive or negative, Newkirk explained.

Motivational theory says that all people have needs which never cease and that some needs are more significant than others, Newkirk explained. A satisfied need doesn't motivate the person any longer, he added.

Survival is the most basic need and once that is satisfied, security or planning for the future becomes important, according to Newkirk.

Next justice or relative position compared with the next man becomes important; when that need is satisfied, then status in the organization must be fulfilled, he said.

The last and most difficult need to satisfy is giving meaning to the individual's work, he said.

The people in a DP shop have needs at various levels, but most are concerned with the last since everyone wants work that teaches them something, Newkirk said.

Money as Motivator

Money can be utilized as a motivator in some cases, but the job itself is the best method of motivating employees, Newkirk said.

If an employee is unhappy with his salary, he can ask for a raise, quit or withhold work to equalize the situation, Newkirk explained.

Motivating through work is difficult for a manager since there are limited opportunities to distribute to each employee, he said. The opportunities should be given to those people who are good workers, but are presently dissatisfied with their jobs; those are the people a manager wants to keep but might be in danger of losing, he pointed out.

Training is sometimes used as a motivating factor, but it is not a very good one in Newkirk's opinion. If employees are given a skill they can't use in their job, they'll go somewhere where they can use it, he explained.

Training is only a motivator if a worker benefits by it in his job; the skills gained should be used immediately after they are learned, he said.

In the end, it's the little things that make workers happy, and an understanding relationship is one of the fundamentals, Newkirk said.

Newkirk outlined some basic measurement concepts including defining and establishing a goal. Since most goals are too big to be manageable, interim goals must be set up.

If a goal is not met, the employee or team should be punished in some way, he said.

A frequent problem encountered by the manager is an imposed deadline, according to Newkirk. The tighter the deadline, the less planning occurs — when in fact the opposite should happen, he said.

A manager should plan for contingency problems by trying to realize what they might be and work around them, Newkirk said. A good manager will learn to develop an early warning system about problems to avoid taking time out from his other functions to fix a problem with the system or the procedure, according to Newkirk.

The last major problem to deal with is the "prima donna" employee who considers adoration to be his due. The manager should strike a bargain by putting up with it, but only as long as it doesn't interfere with someone else's work and as long as the prima donna provides an excellent product, Newkirk said.

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Misconceptions Called Blocks to Privacy Laws

By Ann Dooley
CW Staff

NEW YORK — Congress will never gain enough public support to pass a law protecting individuals from information abuses by insurance companies until a number of common misconceptions are erased, according to Robert Ellis Smith, publisher of *The Privacy Journal.*

One common misconception is that privacy and security are the same thing, Smith said. This is not so and, in fact, most abuses come from authorized rather than unauthorized use of information, he told attendees of a recent conference here.

Another misconception is that insurance companies are protecting privacy by not disclosing medical data to the patient, Smith noted. Other people see that data, and the patient should also have the right to view this information, he contended.

Still another misconception is that privacy rules would be expensive. That is not the case because many would simply involve good security or proper management, he said.

Some also allege that those who complain about invasions of privacy are those who have something to hide, Smith said. That is untrue since many just want to be sure the compiled information is accurate, he explained.

As for the argument that business would be able to protect personal data better than government because it is more streamlined and efficient, that is also false, Smith claimed, because in the rush for profit, privacy protection would not be a business' first priority.

Another misconception is that the problem lies with someone else's information handling methods. The police blame the credit agencies who blame the FBI who blame insurance companies, Smith said.

But "we're all information collectors or information victims," he reminded his audience, noting more than 50% of the population is involved with information processing.

Voluntary Compliance

Speaking for the insurance industry, Edward Cabot, assistant general counsel and chairman of a privacy task force for the Equitable Life Assurance Society, said voluntary compliance is the best way for the insurance industry to protect privacy.

The Privacy Protection Study Commission's recent report should serve as a model on how information should be handled, Cabot said. The problems won't go away and will only be an impetus toward legislation, he cautioned.

However, he did warn that one recommendation made by the commission is dangerous because it "goes to the heart of the underwriting process." Changing the information requested on insurance forms would jeopardize the process since it is essential to know enough about an individual to classify him in the proper risk category; otherwise, other policyholders might have to take up the slack, he said.

Balance Applauded

The commission's attempt at balance between the government and the individual should be applauded, according to Russel Press Jr. of Travelers Insurance Co. Press said he likes the idea of having specific recommendations for specific businesses rather than a shotgun approach to privacy.

All segments of the insurance industry, however, are treated the same, although each is quite different, he added.

People should have the right to complain about the relevance and propriety of information use, but government won't leave it at voluntary compliance and the underwriting ability could be hampered, Press said.

Since many people don't take advantage of the right to view their records when they can, any law should require that information be disclosed only at the request of an individual — an approach that would also prove less costly, he said.

Ron Plesser, former general counsel of the Privacy Protection Study Commission, explained how the commission came to recommend the changes in information handling it published in its final report last July.

The commission tried to put the individual back in the middle so he could find out what's going on and fend for himself, Plesser said, noting the government would be used only as backup.

Insurance authorization forms often ask for information that doesn't relate to insurance, he added, recalling that one witness before the privacy commission described them as "open search warrants."

Individuals should have the legal right to access their insurance forms and the right to correct or delete faulty data, Plesser stated.

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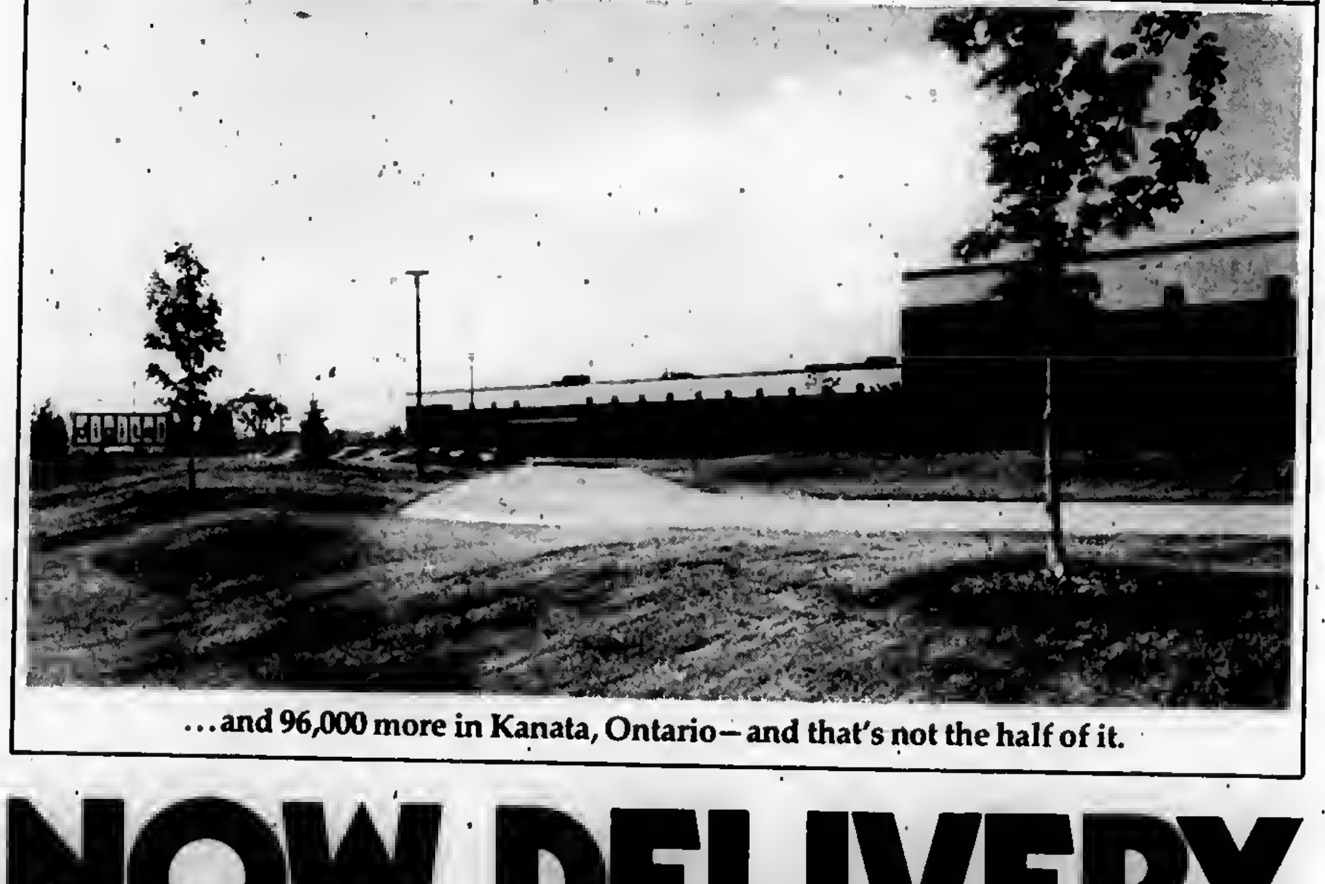

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For On-Line Applications

Novice Users 'Program' Via Questionnaires

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. – How do you encourage users with little or no formal computer training to take a more active role in programming their on-line applications?

One method involves the use of questionnaires, according to Donald Devine, president of Comshare's Human Resource Management Division in Philadelphia.

Devine recently described the technique and its potential benefits at a conference here in a technical session entitled "Getting the Non-DP-Oriented User to Program by Questionnaire."

As Devine explained in his presentation, the procedure begins when a time-sharing firm like Comshare sends a user a standard questionnaire requesting key information about an application the client wants performed. From the data the user provides in the questionnaire, the time-sharing firm generates two documents – a statement of the application's main features and an "input preparation list" (IPL), which shows in schematic form the data needed to perform the job.

The user then completes this customized schematic and returns it to its source. The result is an automatic, distributed program that is customized to the user's application, Devine said.

The purpose of this form of programming is not to turn nontechnical users into programmers or to force them to learn a full-fledged programming language. Rather, it aims to take advantage of users' intimate knowledge of their applications and to make them accountable for the applications' success or failure, Devine explained.

In the past, users were encouraged not to get involved in their systems programming but to rely on DP professionals to understand and meet their applications needs. As a result, many on-line jobs failed for lack of knowledge about user problems.

Devine illustrated the programming-by-questionnaire concept with the example of a profit-sharing plan accounting program his firm wrote for a bank's trust department.

This application, he said, imposed four constraints on the program: it had to be easy to learn, mostly error-proof, timely and economical.

To write the program, Devine's company first developed a general approach to solving the client bank's applications problem. This approach involved writing a data base management program and placing it in a data base management system, he recalled.

Next, the firm wrote a second program to decide what data would be needed to construct a satisfactory profit-sharing plan and then translated this data into data base management system language, Devine said.

Finally, the company developed a questionnaire for specifying the parameters of the bank's profit-sharing plan. The questionnaire was self-explanatory to anyone who was familiar with the language of the application, he added.

Since the institution of the program-by-questionnaire concept in February 1976, Devine and his colleagues have developed 130 profit-sharing plans serving 20 client banks and 3,900 employees.

The technique also works well with applications like treaty reinsurance processing and with standard accounting functions like payroll, general ledger and accounts receivable, Devine said.

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Anderson, Bell Physicist, Awarded 1977 Nobel Prize

MURRAY HILL, N.J. – Dr. Philip W. Anderson has been awarded the 1977 Nobel Prize in Physics for his role in developing an improved understanding of localized magnetic moments.

Dr. Anderson, a consulting director in the Physical Research Division of Bell Telephone Laboratories and a professor at Princeton University, shares the award with John H. Van Vleck of Harvard University and Sir Nevill Mott of Cambridge University, England.

Localized magnetic moments, Dr. Anderson explained, are atomic-sized magnets that remain fixed at a particular site in a metal. His research resulted in a better understanding of why certain atoms such as iron are magnetic when dissolved in nonmagnetic host metals and why other atoms that might be expected to be magnetic are not.

Anderson has also made several other fundamental discoveries in magnetism. One of these relates to the reason why certain insulators containing transition metals such as gadolinium and europium are magnetic. One of these materials, called magnetic garnet, is the basis for magnetic bubble memories, which will play an important part in telephone equipment and computers.

Dr. Anderson will be the fifth Bell Labs scientist to be awarded the Nobel Prize in Physics. According to the Royal Swedish Academy of Sciences, he and his colleagues will be given the $145,000 prize on Dec. 10.

Australians Favor Accord

(Continued from Page 17)

data is regulated by statute, and a New South Wales privacy commission is now developing guidelines for the collection, storage and dissemination of data.

The general interest in privacy coincides with that of other countries, Brower stated, as well as with a number of developments to secure legislative protection of human rights that have been taking place in Australia recently.The 1975 Racial Discrimination Act, the forthcoming Freedom of Information bill, the government's intention to establish a Human Rights Commission and appointment of the Commonwealth's first Ombudsman in 1976 all point to privacy as a right to be legally recognized and protected.

In addition to these developments, the Law Reform Commission is concerned that "major trends in computing technology can be expected that could result in an increased availability of dispersed processing power serving wider sections of the community in entirely new fields."

Transborder data flows are being specifically studied by the commission. Based on its findings to date, it has concluded that international action is indeed necessary. "The handling overseas of information on Australian residents should be in accordance with procedures acceptable at the domestic level.

"Where this is followed there should be generally no impediment on the flow of such information, provided that its treatment and dissemination overseas are in accordance with the rules developed in the country of origin. The commission favors an international agreement on standards to be observed and to minimize disruption to transborder data flows.

"Care must be taken so an agreement will not be so vague as to be meaningless."

Davis: DP Risks Worth Taking — With Care

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The risks inherent in using computers are somewhat analogous to the risks of using automobiles — cars kill about 50,000 people a year, but we use them anyway since the advantages far outweigh the risks.

The public perceives many risks arising from computer use including the rapid approach of "the Big Brother society" and the loss of freedom of action and individual privacy resulting from allegedly unregulated electronic surveillance and large computer data banks.

This comparison between computers and autos was made by Ruth Davis, Deputy Undersecretary of Defense for Research and Technology, before an audience at a recent conference here.

The public also attributes the loss of jobs to automation, the loss of students' arithmetic skills to the widespread use of electronic calculators and the increasing complexity of modern warfare to the use of computer weapon systems, she said.

Along with these generalities, Davis offered some specifics. One problem that already has a 25% probability of occurring is that enough plutonium could be obtained in one year to build a bomb because of the round off errors in the plutonium accountability system at a nuclear plant site, she said.

A more common, albeit mundane, problem is a 30% probability of error in the credit records of any individual possessing more than three credit cards, she said.

Science Fiction Scenario

Davis suggested what she called a "science fiction scenario" in which computer applications were banned in all 50 states during the same six-month period except for those in scientific laboratories involved in defense or nuclear activities. Any other proposed applications had to be approved by the state legislature and licensed and monitored by public advisory groups.

During the same period, Congress voted into law a ban against all computer applications where management was unable to guarantee zero risk.

As the consequences of these actions spread through the DP industry, five major efforts swung into action, Davis suggested. Managers had to assess alternative ways to perform functions now handled by computers, develop legally acceptable interpretations of "zero risk of damage," determine the national and international value of computers in terms of a country's ability to wage military and economic warfare, arrive at legal definitions of what is and is not a computer, and assess the effects of the ban on employment and the economy.

The first reaction to the ban was a relaxation of the public's feeling of computer threat.

Experts were incredulous and most agreed they could not run their operations without computers, Davis said, as she continued her scenario.

Since there were no means for judging the safety of computers, the ban resulted in a tremendous investment in the preparation of "computer impact" statements needed to prove zero risk damage, Davis suggested. It was determined that a computer system would be safe if its risks were judged to be acceptable. The weaknesses and deficiencies of computer systems and the problems of creating safeguards became immediately apparent, she said.

Within 30 days of the legislated computer ban, Congress passed a law superseding all states' laws banning computers which permitted computers in high-impact applications to resume operation for an interim period, Davis said in her story. These included large funds-disbursing systems, national security and defense systems, large individual information systems — such as law enforcement and patient record systems — and real-time systems used for public protection or for public services, such as the telephone, reservation and weather-predicting systems.

"Hopefully, such a scenario will remain science fiction, but its contemplation by managers would lead to an acceleration of our efforts to look at the risks of computer systems," Davis said.

"It may seem to many of us that computer professionals can do nothing right today in the eyes of the public, but I suspect the real truth is that they cannot make progress fast enough. Thus, I would conjecture that computer professionals have a real mandate to accelerate their efforts in making computers safe and in setting acceptable levels of risk," she concluded.

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Editorials

No Wonder . . .

. . . IBM has been trying to keep thousands of confidential documents out of the record in the U.S. vs. IBM antitrust suit — some are shockers (see story on Page 1).

The company has fought for years — through two appeals (one to the Supreme Court) and even the risk of a heavy fine — to keep thousands of internal documents out of the hands of the government.

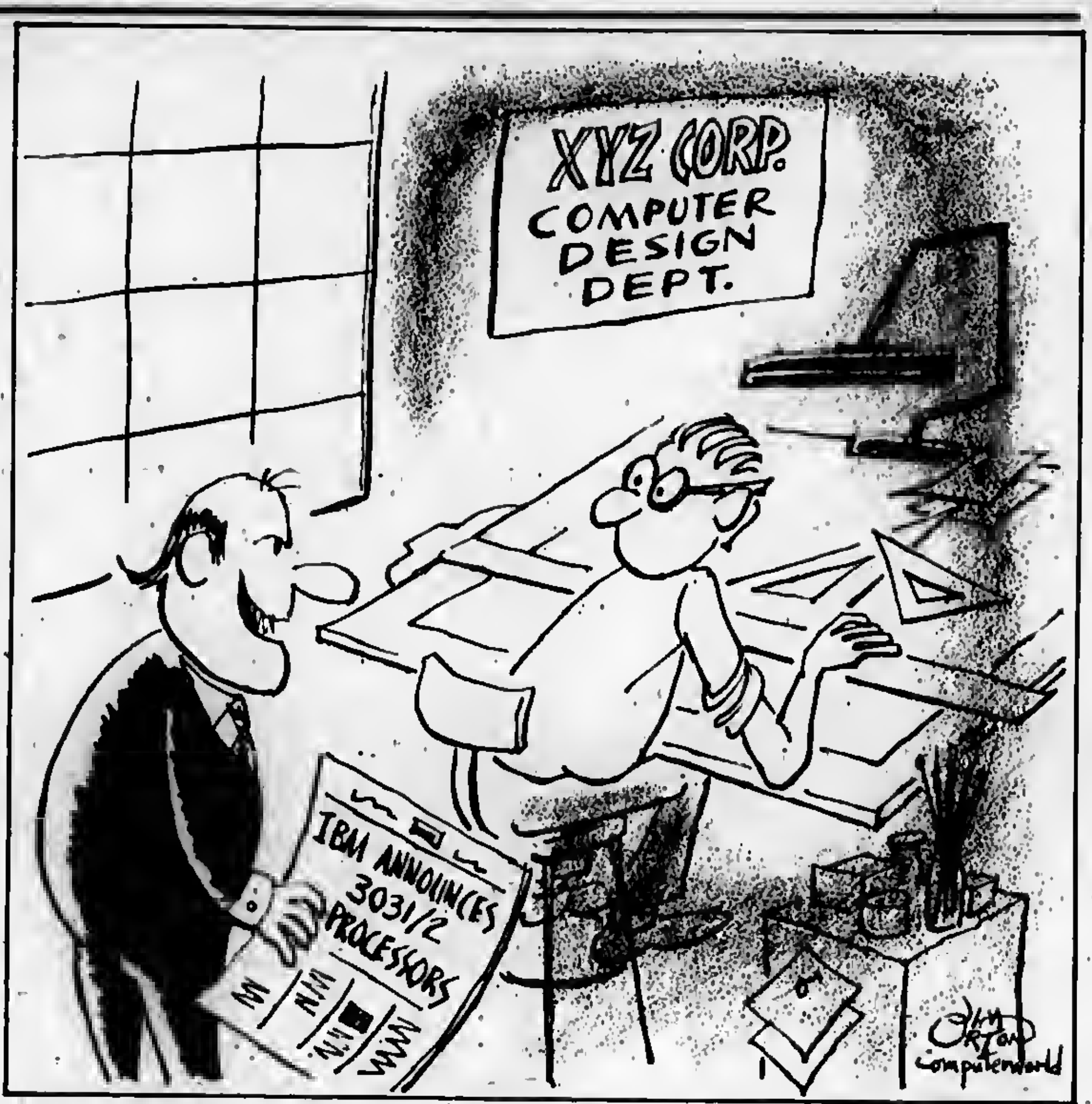
The firm has been rebuffed at avery turn and finally a few of the documents have been put in the public domain.

None are truly "smoking guns" that by themselves would prove the government's allegations of monopolization, but the first group indicates that IBM tried to "launder" its files in a manner that would make its position in the industry harder to detect.

People experienced at reading IBM documents relaased during various cases against the firm have often wondered why tha documents seem to raise as many questions as they answered.

Now the picture is becoming clearer: IBM managers were instructed to remove certain documents from their files.

Perhaps those documents that may now he irretrievably lost containad many of the answers to the questions that have been raised by IBM's conduct in the business.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U.S. Out of Step on Privacy

In the past month or so, there has been a great deal written and said about the issue of transborder data flow and the need to protect personal data as it moves from one political jurisdiction to another.

Unfortunately, the U.S. appears to be out of step with the rest of the industrialized Western world on this issue.

Many of the countries in Western Europe have enacted statutes that protect the privacy of their citizens when personal information is stored in computerized information systems. Now, logically, they want to extend that protection of citizens' rights in cases where the data is stored in another country.

After all, it does little good to have laws protecting the confidentiality of information on a German citizen in Germany, if that same information can be accessed freely in the U.S., for example, by the multinational company that employs him.

In order to extend this protection, the Western European nations are trying to come up with an international agreement that would serve to keep information confidential no matter where it is stored.

The U.S., however, wants more time to study the issue, since it is one of the few countries that has no omnibus data privacy legislation on the books — and apparently has no desire for such legislation.

And while the Council of Europe only proposes to implement its data protection agreement in two years, the U.S. representatives of the information industry say there is a need for a longer study period.

But while the U.S. information collectors fight against wide-ranging and meaningful privacy legislation in this country, they also want to do business in countries that have such legislation — and do such business under the loose regulations that govern them here.

The information industry here has fought against any type of omnibus privacy legislation — and, because business speaks in Washington, it has been able to convince commissions and Congresses that there is no need for a univarsal law to protect privacy.

We disagree with that position and feel that an omnibus privacy law is necessary to clearly spell out the rights of the data subjects and the responsibilities of the data collectors.

If the U.S. information industry does not want to make the privacy and confidentiality of data a high priority — and there are no indications that it does — then it will just have to lose business in countries that care more about the rights of their citizens.

The U.S. industry has to learn that it can't hava it both ways.

Data Past

Five Years Ago
Nov. 8, 1972

WASHINGTON, D.C. — The National Bureau of Standards launched a six-month study to determine the significance and impact of Ascii as a federal DP standard.

Under the fedaral standard, all computers and related equipment brought into the federal inventory after mid-1969 wera supposed to be compatible with Ascii.

It was hoped that such compatibility would facilitate the swapping of information and programs between DP canters.

Eight Years Ago
Nov. 12, 1969

DALLAS — A proposal for a nationwide common carrier communications network "custom-tailored for use by computer usars" was getting final touches here for presentation to the Federal Communications Commission (FCC) by Data Transmission Co. (Datran). The Datran proposal came threa months after the FCC ruled that Microwave Communications, Inc. (MCI) could establish the first link in what MCI said would also be a nationwide communications network.

Letters to the Editor

Forewarned Is Forearmed

Anyone contemplating purchase of Univac hardware should be aware that a later sala to a new user may involve expensive replacement of components before Univac will provide a regular maintenance contract.

No matter that the hardware has always been under Univac's maintenance! If it thinks a component might fail in the next year, Univac requires you to pay extra for its replacement before it will give a maintenance contract to a new owner.

Further, this additional charge is unpredictable and can be high. Witness our sale of a whole system where replacements cost 25% of the system's selling price.

James K. Morrow
DP Manager
S.M. Hyman Co.
Baltimore, Md.

Astounded in Nashville

As the press for our industry, you should be aware of an event that happened here on Oct. 13. I hope you will becoma interested enough to do something about it.

Robert Sherin has bean crusading through the courts fighting software taxation. Sherin was here in Nashville to fight a Tennessee software tax through federal court. He lost.

I was in the courtroom with him, so I know exactly what happened. I was completely astounded by what the judga, L. Clura Morton, said.

The issue was simple. The Supreme Court of the Stata of Tennessee, in the Commerce Union Bank vs. Tidwall case in Juna 1976, found software to be intangible and nontaxable.

In spite of this, in April of this year, the governor of Tennessee signed into law a bill that said software is tangible and taxabla. Sherin sued to have this law nullified because the court had ruled just the opposite just 10 months before.

Morton said that "a legislature could call a male a female and a female a male if it wanted to and that it could call a whita a black and a black a white." If this is true, imagine the implications here!

He also discoursed on the equal status of the legislature, the courts and the administration. In effect, he didn't say anything rational to me, but made a statement that Sherin could "take it up" — meaning take the case to the appellate court.

Taxation, of course, is crucial in all our lives and maybe software is taxable. But when the legislature and the Supreme Court of a state take diametrically opposite views on a matter as important as taxation and a single man, even though he is a federal judge, dismisses one of the protagonists out of hand as he did Sherin, it's time somebody did something.

Morgan W. Huff
Nashville, Tenn.

Turing Text Forthcoming

The article "Languages in Deep Trouble: Turing Winnar" [CW, Oct. 24] raised more questions than it answered. It did make me curious.

Pleasa tell me how I can get a copy of the Backus Seattle speech.

A.T. Hathaway
Charleston, S.C.

The text of the Turing lecture is now being adapted and extended for publication. It will appear in the Communicotions *of the ACM* **"probably early next year," according to an association spokesman. Ed.**

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Result of Poor Management

DPers Victims of Undue Behavior Shaping?

By Jack Stone
Special to CW

There is no question that employees of any business organization are properly required to conform to its business decisions. It is naturally assumed that these decisions are effective ones developed by experienced, intelligent managers.

But in reality, all of us have been forced, from time to time, to wallow in the business swill that results from management decisions that range in quality from the ridiculous to the idiotic. Are companies aware of what the pressures of incompetent managers can do to the mental stability of the serious-minded employee?

Just read this letter from a reader who has had to endure the grim psychological fallout from bleak management in a large computer manufacturing firm.

Dear Jack:

I have been following your series of articles with great interest, being a computer professional who has occasionally exhibited human traits. I think it might be worthwhile to investigate the behavior modification and psychological conditioning that goes on in large organizations, however unintentionally, to affect individual programmers and engineers.

Consider [my] case: an engineer who, in his career of a half-dozen years, has had experience in every area of computer science from integrated circuit layout to operating system design. He finds himself working for a large computer manufacturer performing a variety of duties on a product development team. If the team were well run, then this person could make a major contribution to the product design, given his better-than-average understanding of the global design decisions that need to be made.

However, the team is poorly run. Reprocessed technicians are doing the engineering job — designing the hardware. [Mechanical] engineers who have never even had a Fortran course are writing software disguised as "vertical microcode." And market planners are too busy promoting their pet functions to discover what product is really needed.

So what does our engineer do? Likely, he will try to turn the project around to whatever extent possible, both because he feels that this is what the company is paying him for and because of his professional pride — he wants to build a good product.

He fails, however, to reckon with the Peter Principle and Parkinson's Law — managers prefer employees who don't make waves. Our engineer soon finds himself sidetracked on some job for which he is "desperately needed," such as reprogramming a widget to work sideways and upside down ... Always, of course, there is the promise that he will be given more control over the product architecture as soon as he is "free."

So what happens? The product gets developed at considerably more expense than would have been required if our engineer's suggestions had been followed, and its function and performance are considerably inferior to competitive products. To rub his nose in it, our engineer has to spend the first several months after the product is shipped traveling around the country fixing the technician's hardware and the mechanical engineer's software.

The Human Connection

If this hasn't been enough to break the spirit of our engineer, then management arranges to promise a position of increased responsibility on some follow-up product. Once again, his suggestions are ignored, usually in the name of avoiding hardware or software changes (although all of it will end up being changed anyway). And once again, he ends up getting shuttled off on some side issue.

So what is happening to our subject psychologically? If he is at all malleable, he learns to keep his mouth shut and do whatever job is assigned to him. He thus becomes management material. If our subject is made of sterner stuff, he is in a psychological and moral quandary: Doesn't he have a responsibility to the customer to build the best product possible? Shouldn't the product be designed as effectively as possible so that it won't have to be redesigned two years later at great additional expense? Such a dilemma is a textbook cause of psychological crisis.

So our engineer ends up getting hauled off to the loony bin; or he becomes a beachcomber in Tahiti; or he spends all of bis spare time milking cows on his hobby farm and waiting for retirement. In any event, the industry loses a valuable contributor to the advancement of computer architecture...

My final question is this: To what extent is this psychological pressure an accidental side-effect of managerial incompetence, and to what extent is it the purposeful result of the personnel manuals and management training seminars that are rampant in my company (and yours?)

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007

Management as Scapegoat

Marketing Practices Cause of Poor Controls

The IBM-funded report from SRI International that has been talked about for years has now arrived [CW; Oct. 24] and has made internal auditors and management scapegoats for lots of problems.

This thesis started — as far as I am aware — with the accusation that internal auditors were almost totally ineffective in limiting computer crime, although they were in the best position to do so. It leads to the conclusion that more DP use by more DP-trained auditors (and management) is the best approach to take now.

The Taylor Report
By Alan Taylor CDP

As a conclusion, this is comfortable to both the accused auditors (who get more jobs) and to computer vendors (who sell more auditing applications). It is not, however, agreeable to management, which is being accused of "abdicating" its responsibilities.

The report described management's action as an "abdication." However, is there any evidence that management acted voluntarily in releasing what are now regarded as essential controls, or in not building in new ones, as they became necessary with the advent of data processing? If there is, then I have yet to see it.

In fairness, until it is shown that management was in fact acting voluntarily, it should be assumed that there was some business or other constraint that compelled it to act in this now-condemned manner. After all, it is highly unlikely that managements of thousands of businesses in hundreds of countries would simultaneously go soft in the head and expose their operations to many dangers.

Personally, I think there was, and indeed still is, a major constraint acting to keep management in a situation of weakness in the face of computer operations. This is the combination of the state of the art and the marketing methods that have been developed and used on a worldwide scale.

State of the Art

There is no doubt that during the period 1955 through 1977, the state of the art in computing has been changing and improving. Every improvement, be it in hardware, software, application or environment, has meant that new and better methods became available.

The very fact that they were new meant their problems had not been fully appreciated. Consider, as a recent example, the problems of converting from one data base management system to another. As the currently reconvened NBS/ACM [National Bureau of Standards/Association for Computing Machinery] Fort Lauderdale conference is finding out, it is much more difficult to move from one DBMS to a later-generation one that it is to move to a DBMS in the first place.

Yet, when people started moving into early DBMS operations, this negative factor was simply not foreseen, or brought out.

Equally, in the case of computer programmer crime, when commercial applications were started, there were so few experts on any particular hardware/software combination that there was no worry about some outside, unknown enemy being able to infiltrate a system. Any infiltrator would have to be an insider and it would be pretty obvious who it was. Now, when thousands of people can find the weaknesses of most common hardware/software applications without even coming into the organization, the situation is dramatically changed.

So, the state of the art was such that swift adoption of new methods was and continues to be dangerous. But, the obvious advantages of state-of-the-art computers have made their use effectively obligatory to management.

What went wrong, then, was not the use of untried methods, but the lack of adequate warning and proper instruction as to the allowances that should be made for any dangers. Neither management nor the advancing state of the art can be blamed for that...

That ignorance was the result of three almost universal marketing strategies:

- To leave out any allowance for nonobvious problems in the cost-justifications offered to encourage equipment purchase or rental.
- To sell only on contract terms which were totally one-sided.
- To complain to upper management that anyone who challenged the inadequate cost-justifications was being "obstructive," or simply not up to understanding computers.

A more reasonable and even-handed partnership between seller and buyer is possible even now. There are many things coming that will have great advantages and concealed problems. But one-sided accusations against management for abdicating its duty — when it was, in fact, deposed by marketing tactics at a time of swift and valuable advances — delay rather than hasten the day we will get that partnership. The SRI report should be withdrawn and replaced by a neutrally funded one.

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Letters to the Editor

Job Accounting Systems

I enjoyed Lawrence Cooke's article "Perfect Chargeout Just Not Obtainable" [CW, Oct. 17]. The problems he alludes to are so large and confusing that our firm has chosen, for the time being, to ignore a mechanized job accounting and billing system along with its incumbent and sizeable overhead.

Most job accounting systems of which I am aware have the same drawback. They alienate users by presenting bills in indecipherable terms.

Suppose your laundry operated in the same manner as a DP department and sent you a bill in their units instead of yours. It may read as follows: "525 gallons of water - 15¢, 48,000 BTUs to heat water - 37¢, 22 lbs. soap @ 10¢ = $2.20, 74 hangers @ 3¢ = $2.22, Tuesday schedule - 75¢, Labor - $40.00, Total Due = $45.67."

Nowhere have you been told in your units (e.g., shirts, pants, dresses) how much each costs and concomitantly what can be done to reduce the bill. Your laundry manages to solve the complex billing problems of space utilization, priorities, efficiencies, demurrage, etc., and it would assist DP public relations if we would learn to think and bill in terms of the user's units.

The billings produced by most job accounting systems are a technocrat's voluminous, detailed half-baked attempt to solve a business problem. The attitude is often "If we have to produce a bill, by God, we'll produce a big, complete one."

The future of information systems in any company depends on our ability to successfully look, act, talk and walk like the other ducks. As long as DP management provides arcane reports full of our units (EXCPs, on-line bytes of storage, tapes mounted, etc.) instead of user units (invoices read, purchase orders written, passengers booked, etc.), we will be disparagingly regarded as "technical management" but not "management."

I look forward to reading more articles on job accounting sytsems.

Geoffrey S. Hicks
Atlanta, Ga.

Delicate Situation Abroad

Thank you for the coverage you are giving my country in both articles and letters. The recent references to IBM, the Anglo American Corp. and the question of business ethics as applied to our troubled situation are entirely relevant to all your South African readers and to anyone else interested in the social implications of capitalism.

Your wider readership may like to know that both the companies mentioned above are well known here for their progressive employment practices, IBM as a leading foreign company and Anglo American as the largest South African private-sector mining and industrial group.

As a former employee of IBM, I have had the pleasure of watching a young black school-leaver who joined IBM as a clerk-cum-messenger a few years ago rise through the ranks to become a responsible manager. Although this is not an isolated case, there are still regrettably few organizations where merit can be recognized without the intrusion of the color bar.

If pressure on foreign companies such as IBM grows to the extent that they curtail their operations or withdraw from South Africa, an active, though subtle, force for change in our society will have been stopped.

Frank Cary has indicated that his company is already selecting its customers in this country based on some sort of human rights criteria [CW, Sept. 19]. This has left me with the sneaky feeling that, if pushed too far, his policy will lead our government into an official reprisal. That could adversely affect all IBM users, "goodies" and "baddies" alike, not to mention the almost 1,500 IBM employees in South Africa.

I should be interested to read more news and comment on the issue of doing business with us South Africans.

John Coombe
Durban, South Africa

Irresponsible Reporting

The Sept. 19 front-page article headlined "Alternatives Catch Eye, Not Buy of IBM Users" encompasses unethical practices of gathering information, irresponsible editorial license and distortion and inaccuracy in reporting.

I am not alone in my posture relative to the article as evidenced by a number of calls I have received, some of which were from others "quoted."

Computerworld is well known for its survey-type activities, and I have frequently responded to questionnaires and calls from CW and others. When responding, I give personal opinions and in no way represent myself as a spokesman for the Joseph Schlitz Brewing Co. I am certain that many others quoted responded in a similar vein.

I do recall a call from CW, and at no time was I ever advised that that information was for publication. Had I been so advised, I would have insisted on reviewing the article first. Without going into specifics, the quotes attributed to me were incorrect.

If CW wishes to report on the posture of large companies, it should go to appropriate levels and not to a DP manager, systems analyst or anyone who answers the phone. In addition, if it is gathering information for publication, it has an obligation to make its intent clear.

R.L. Babcock
Manager, Information Processing Services
Joseph Schlitz Brewing Co.
Milwaukee, Wis.

Bogged Down in Licensing

How pleased I was to hear from my friend Ken Lord again [". . . And In This Corner," CW, Oct. 17]. Ken is an energetic and persistent campaigner, but I wish he would turn his considerable abilities toward more important problems.

His campaign is based on three assumptions all of which are clearly false:

- That licensing or certification will eliminate shabby practices among shabby practitioners.
- That standards of practice can be generally agreed upon for various specialties within the industry.
- That the issue is still alive among any number of influential people in the industry.

The fact that the issue "still won't die" does not imply any merit in the idea; witness that voodoo, phrenology and belief in the Easter Bunny persist as well.

Steve Schiavo
Arlington, Va.

Mature, Level-Headed?

Frederick G. Withington, obviously smarting from his recent chewing out by the courts, has indeed displayed great "maturity, humility and level-headedness" in his latest verbal dump aimed at making the DP manager the scapegoat of the industry ["DP Managers Still in Adolescence," CW, Oct. 17].

That just goes to prove that it takes more than a raft of bits and bytes to assemble a few logical words. Thanks for the suggestions, Withy!

James G. Phillips
Lake Oswego, Ore.

Systematic Kiting

In regard to Alan Taylor's Oct. 3 column about ethics questions, it is my understanding that any competent high-volume cash management system already "systematically kites checks" in the sense of allowing checks to be written on funds which *will* be on deposit rather than funds which are on deposit. The system then helps make sure the required funds are deposited as needed. That's where the term "cash management" comes from.

I think Taylor needs to do some homework. He may also want to reconsider some of his rather provincial definitions of ethical behavior. It's not nearly as simple as it looks.

Laurance F. Wygant
Schaumburg, Ill.

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Grasshoppers vs. Ants: On-the-Job Performance, Not Certificate, Matters

By Joe Rigo
Special to CW

Every industry has its ants and its grasshoppers. The ants do the work. The grasshoppers sit around the hotel bar and talk about professionalism.

The ants get the promotions and the pay raises. The grasshoppers have more fun.

That is, most of the grasshoppers have fun. A few miss out. Thay are tha ones who worry a lot. Mainly they worry that the ants are giving the profession a bad name.

Which brings ma to the Institute for the Certification of Computer Profassionals. The instituta was set up a few years ago to sell certification exams to the data processing industry.

From the start, the institute's leaders realized they had a problem. They knew there was no good reason why anyone would want their product. They knew their certificate would not help a person get a job, win a promotion, lose weight or find a better sex life.

So they elected to pursue their goal by repeatedly pushing three arguments:

- The profession is populated by boobs and scoundrels.
- The industry must regulate itself voluntarily or the government will force licensing on us.
- Certificata holders are the only trua professionals.

The institute nevar made much effort to prove any of these points, which is understandable. It is hard to argue massive incompetence at a time when we are surrounded by working systems and bright new applications.

The threat of forced government licensing is another spurious issue. There is no way such a program can get the support it needs while we still have a shortage of trained specialists.

The main effect of any licensing program is to restrict the entry of new people into a profession. In our field, the technology is evolving as fast as ever, and it is always the new people who are most comfortable with the latest goodies. We need them too much.

As for the alleged superiority of certificata holders, no one knows. The institute can't say whether its alumni have become pillars of the profession or hatchet murderers.

Equality in Failure

There has been some research, however, and it ls the main reason for this essay. lt concarns the test for the Certificata in Data Processing (CDP).

One of the institute's commlttee chairmen, Pat Smith, conducted a reviaw course for the CDP exam at the University of Manitoba a few months ago. He found that applicants with college degrees in computer scienca who took the course had no trouble passing tha exam.

They breazed through tha technical parts, whlch was expacted. They also breezed through the management and accounting sections, which was not supposed to happen.

On the other hand, the failure rate was almost 100% for graduates of two-year community colleges and vocational schools.

Smith's report should warm the hearts of college deans from Harvard to Stanford. They can sleep peacefully, knowing that the institute andorses their work.

At the same time, it shows that the certification process offers no guidance in the one area where it might be helpful. The test does not saparate the good two-year courses from the bad: All fail equally.

Reader Commentary

Directors of the institute were a little upset to learn that peopla with no management experience were doing so well on their test for managers. But they didn't let it bother them for long. They plunged right ahead with their new examination for senior programmers.

The new exam has one big thing going for it. Anyone can qualify.

The big market for certificates is among recent college graduates while they are still inexperienced and insecure. Up to now, they had to wait three years before they could qualify for a CDP. By then, most lost interest.

There is no waiting period for the new certificate. It should be enormously successful.

Recent college graduates may not be able to find their way to the coffee machine without a guide dog. But their education has trained them to be absolute experts at passing multiple-choice tests prepared by college professors. And that is exactly what the new exam is.

I predict that we are about to have a massive explosion in the senior programmer population. It has become possibla for hordes of eager young people to graduate on Monday, take the test on Tuesday and show up in the employmant office on Wednesday, happily clutching their programmer credentials.

The one good thing is that all of this should drive the old CDP exam out of business. People with one certificate are not going to want to get another threa years later.

This will leave the old-timers with a certificate that no one recognizes anymore. Some will take the new test, but at the risk of finding that their skill with multiple-choice questions has faded.

The others will simply have to go on proving their professionalism by their daily performance on the job.

And that, after all these yaars, is still the way that we separate the grasshoppers from tha ants.

Rigo is president of Sysdoc, Inc. in New York City.

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"Winning Proposal" Winning Big

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Microwaves Sept. 1976

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Convair Managair Feb. 1977

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Reader Commentary

Not a Technical Issue

DP Ethics No Different From Business Ones

By Paul Sita
Special to CW

As the field of data processing matures, questions of ethics are becoming increasingly prominent. Whole groups of related issues are being discussed — the legal status of software, the ownership of employee-produced routines, responsibility for errors in computer systems which automatically transfer funds, etc.

The apparent ease with which the computer may be used to distort corporate accounting records and the difficulty of detecting these distortions boggles the mind.

With technology advancing more rapidly than our ability to comprehend its implications, questions of ethics and the development of the field as a professional discipline has taken a back seat to the technical issues.

Admittedly, the task of applying the latest technological advances to create computer systems that work has been difficult. But with less emphasis being placed on technology for technology's sake and more being placed on the efficient and productive use of technology, questions of ethics are arising and must be met head on.

The position in which we find ourselves at the present is a precarious one. The very usefulness of the industry and its continued growth depends upon the development of the profession as a profession *within* the mainstream of American business, not outside of it.

DP can't be thought of simply as wizardry, with no logical means of evaluating it or the people who practice it. Such an attitude can only detract from the field. The current controversy over the Certificate in Data Processing and the Certificate in Computer Programming bear this out.

What I want to suggest is that we do not have an impossible task before us. In fact, the problem of ethics in DP is simply the problem of ethics in business — nothing more, nothing less.

Although the computer acts as a microscope, magnifying the effects of our procedures, practices and policies, the same kinds of issues can be raised without the computer.

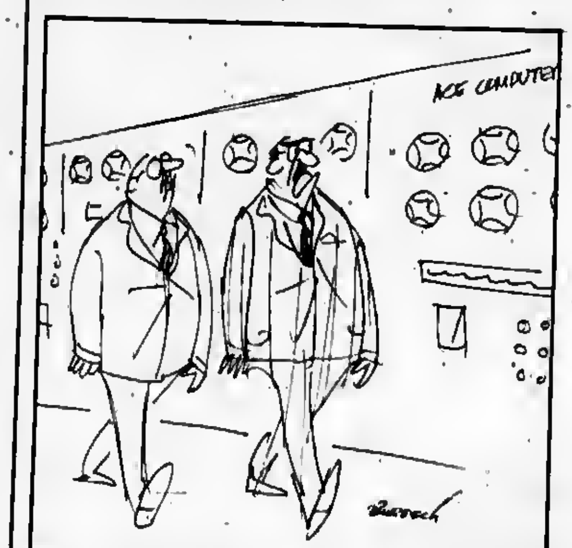
The problem is not a technical one. If we look for "discoveries," we will not solve it. The problem is not one of discovering new ethical standards, but of applying the standards we already possess to a new technology.

It is a people problem. We need to develop an awareness of the fact that DP systems do raise questions of ethics and that these questions are not very different from the general question of the ethical conduct of business.

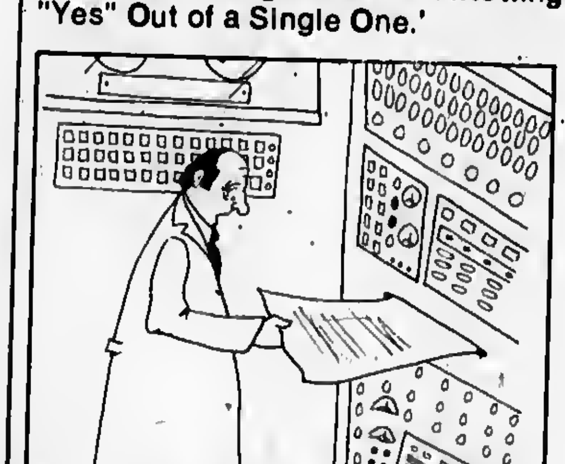
By their very nature, ethical questions do not lend themselves to the simple packaged set of answers we would all love to have. What is required is much more complex — genuine concern, thoughtful discussion and a pooling of insights and experiences.

As is always the case, defining a problem is the first step toward its solution, and this problem is no different from any other.

Sito, who is studying for his doctorate in philosophy, is DP manager for a Long Island-based firm in the home financing field.



'The Trouble With Them Is, You Can't Get a Single Meek Kowtowing "Yes" Out of a Single One.'



'Flying Saucer in the First, Lucky Lucy in the Third, Two and Eight in the Daily Double . . .'

Why the "Chainchart" of the LogicChain System obsoletes previous automated "flowcharting systems" for COBOL users

What is a flowchart?

It is not a flow of a chart. And it is not a chart of a flow. Both the words "flow" and "chart" are adjectives. Therefore, a "flowchart" must be a flow of *something*. It could be a flow of a water system, a process system or any type of system.

In the case of a computer program flowchart, it is obviously a flowchart of procedural statements, i.e. logic (a sequence of events when seen as predictable). It should indicate the procedural linkages, so that what is *actually* needed is a logic *linkage* chart. However, if only linkage *segments* are shown within the chart, the chart does not replace either the Procedure Division Source or the Procedure Division Cross Reference. It simply adds a new document which is required to be consulted.

What is a Chainchart?

A more precise word to replace the word "linkage" to insure that the complete set of logic linkages (flow) are shown within the chart, is the word, "chain". This defines that *all* linkages are shown within the chart rather than simple linkage segments.

Previous "flowchart systems" have never shown anything more than simple linkage segments within the chart. This was equivalent to a person reaching into a barrel for a chain and finding only linkage segments.

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- *completely eliminates* the need for referring to the Procedure Division Cross Reference Listing.
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- provides realistic overall maintenance programming *cost savings of 20 to 40%.*

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'Expert Witness' Volunteers for IBM Trial

Reader Commentary

By Walt Gibson
Special to CW

I read "IBM Designed to Monopolize: McAdams" [CW, Oct. 3] with great interest. Unfortunately, I cannot agree with most of the points made by these "expert witnesses" about the "fighting machines.".

I do not have access to information about IBM's premature order acceptances and therefore cannot comment on this aspect of the "fighting machines." IBM has a habit of introducing "new" concepts slowly into a present product line, thereby debugging the problems on a single machine rather than across the entire product line, as other vendors do. To wit:

- The 360/25 CPU has reloadable control storage and loadable nonresident microdiagnostics. It also has available integrated reader, punch, printer, disk and communications adapters.
- The 360/44 has increased processing speed brought about by relocating the general-purpose registers from slow core storage to storage with 250 nsec access time.
- The 360/67 hailed the introduction of the Virtual Storage/-Dynamic Address Translation facility.
- The 360/85 has a 16K-byte buffer storage to improve processing speeds.
- The 360/91 has multiple execution units for concurrent instruction processing.

Now let's explore the 370 series:

- The 370/125, a step up for 360/25 users, has integrated adapters (this is anticompetitive?). The 360/25 was the primary pilot processor.
- The 370/135 has integrated printer, communications and disk adapters available. Diagnostics are loaded into reloadable control storage.

The CPU goes through a hardware checkout as the customer is powering up and Virtual Storage is standard. The 360/25, 30, 40, 44 and 67 were the pilot processors.

The 370/145 has extended microdiagnostics and the customer 370 emulation coreload loads into reloadable solid-state control storage. The 370/145 separated from microcode certain instruction preprocessing functions that were put into the "I cycles hardware." The pilot processors were the 360/30, 40, 44.and 67.

The 370/155, one of the first 370 CPUs, brought monolithic systems technology into the product line. There was a 370/155 logic card repopulation program to correct certain hardware problems. VS was a large cost option. A buffer unit speeds instruction and data processing functions. The 360/44, 50 and 85 were the pilot processors.

The 370/158 eliminated the 370/155's read-only storage by replacing it with reloadable control storage. A CRT was used for console and maintenance purposes. An extended front-end service processor aids the customer engineer.

The "S" disk records the last eight CPU and/or channel failures to aid in problem resolution. VS is standard, as is a high-speed buffer unit.The 360/25, 44, 50, 87 and 85 were the pilot processors.

The 370/165 uses the same channels as the 360/85 and also makes the 2880 channel available. The 185 has separate instruction fetch and execution units. A CRT is the console I/O writer.

Nonresident microdiagnostics aid service personnel.EPVS is a high-cost option. The 380/25, 44, 85, 85 and 91 were pilot processors.

The 370/188 has hardware enhancements to the 165; the core storage was replaced by solid-state storage. An extended service processor is provided. VS is standard. The 360/25, 44, 65, 67, 85 and 91 were pilots.

As can be seen, features or hardware that were unique to certain 380 series processors are standard on most 370 series processors. Some of these processors, like the Model 67, were corporate "losers."

The R&D work of the VS concept on the 360/67 has shown up in almost all the 370 series processors. What unique ideas introduced on the 370 series processors will become standard on the "Future Systems" from IBM?

IBM started out small in the tab card business. It has excelled and evolved to its present position through a dedication to product support and service to the customer.

I have never been an IBM employee because of the corporation's views on long hair, beards, bluejeans and cowboy boots on field service personnel, so no information you have just read is IBM confidential.

If the Justice Department wants a real view, why not ask the computer engineer on the street about monopolies, IBM, Control Data Corp., Memorex, plug compatibles and the like?

I'll be happy to testify.

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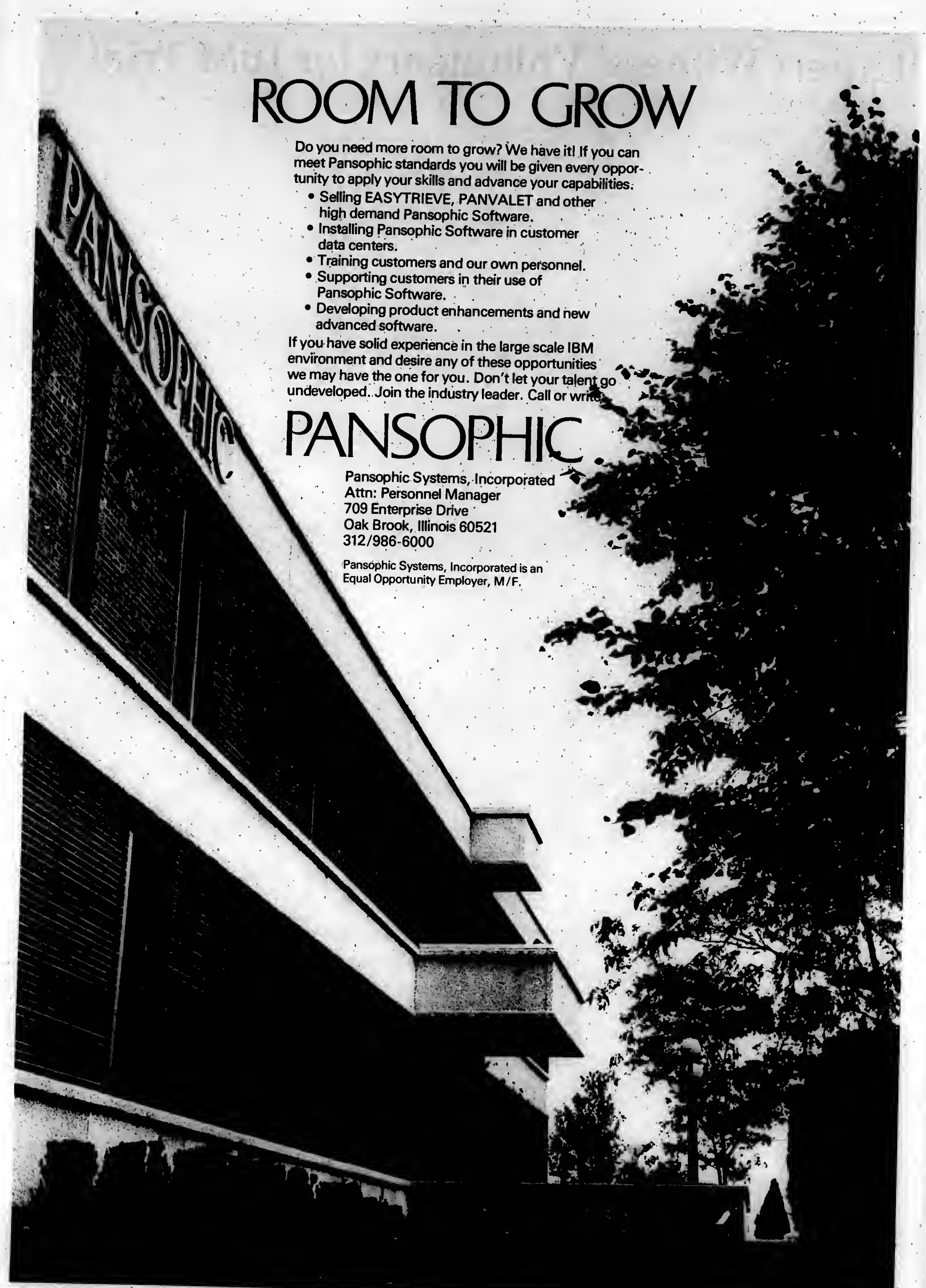

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IPT Gains Difficult to Measure: Chase

By Molly Upton
CW Staff

NEW YORK — When implementing improved programming techniques (IPT), managers must increase the project schedules and initial cost allocations, according to two veterans of the IPT program at Chase Manhattan Bank.

Roger Van Ghent, senior consultant at Chase, and Willard Cohen, vice-president, told a session at a recent conference here that measurement of productivity increases is often difficult if not impossible because of the unstructured environment that previously existed.

Users must recognize that in the early phases of a project, many of the new tools and techniques have a negative impact, such as higher costs and increased time, Van Ghent said.

For instance, structured coding produces a greater number of lines, and "walk throughs" take more time, Cohen said, but the rewards are most likely to come in the testing and maintenance cycles. There is a positive synergistic effect that results from the integrated use of multiple tools, he added.

With the use of the new techniques and the structured life cycle concept, the focus of the DP shop should be able to turn to solving real world problems instead of solving DP problems 70% of the time, he added.

Use Small Entities

In endeavoring to measure results, module users should look for the cost, errors and compiles per module and per thousand lines of code (Kloc) as well as the time to find errors per module and per Kloc, he said.

"If you do this, please publish the results because everyone is looking for them," he said.

To establish some means of measurement, an installation should obtain a base line "on whatever measurement you've used," establish goals and modify the program as more is learned, he added.

Charisma vs. Fiat

There are several methods of installing improved programming techniques, Van Ghent said.

About 30% of firms using them implement them by fiat, while 70% rely on charisma, he said. Chase started by fiat, declaring this was the way, and now charisma or programmers' enthusiasm is sufficient, he said.

Chase, which has about 500 applications programmers, is basically a large centralized batch shop, Cohen said.

When the bank decided to implement the improved programming techniques, it was experiencing all the generic problems such as poor communications between DP and users; solutions didn't match the problems, he said.

The bank had high continuing costs and unhappy users. Often the definition of the problem was left to DP, with user approval granted on a perfunctory basis, he said.

There are four phases involved in the structured life cycle: analysis, design, implementation and maintenance, Van Ghent said.

In the design phase, they recommended development of guidelines and a training program, trying techniques on real tasks, starting a program reference library and implementing the use of the techniques immediately after education.

Added Benefit

Chase found a side benefit when it applied the new techniques to writing the program reference library routines; they "sailed through with zero failures," he said.

The implementation phase involves training teams, not staffs, using the techniques immediately and allowing a long learning curve, probably twice as long as one thinks necessary, they observed.

Project schedules should be modified at the beginning, failures should not be penalized and successes should be rewarded, they said. Managers should worry about efficiency later and concentrate on implementing the new methods, Van Ghent added.

Sigmetrics, CMG Plan Joint Meeting

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Modeling, measurement and management are the three concurrent themes of a major four-day conference on computer performance scheduled for the Twin Bridges Marriott hotel here from Nov. 29 through Dec. 2.

The conference combining theoretical and empirical approaches and experiences over a full range of computer performance evaluation (CPE) activities, is sponsored jointly by the Association for Computing Machinery, through Sigmetrics, and the Computer Measurement Group, Inc. (CMG).

One of the highlights of the conference will be the presentation of the annual A.A. Michelson award for outstanding contribution to the field of CPE.

The two groups ran concurrent conferences in Montreal several years ago, but this meeting represents joint planning from the start so that all attendees can benefit, according to conference chairman Robert Bishop of Ernst & Ernst. This meeting, Sigmetrics/CMG-VIII, is open to anyone interested in CPE, he emphasized.

'Keynote' Paper

An invited paper entitled "A Basis for the Performance Evaluation of Information Processing Systems," to be presented by associate professor Thomas G. DeLutis of Ohio State University, is scheduled for the first morning of the conference and will serve effectively as a keynote, Bishop said.

Technical sessions after that will fall into several general categories including CPE methodology and applications, tutorials, panel discussions and vendor presentations. Speakers and session chairmen represent a mix of backgrounds from academia, industry and government.

Within the methodology segment, CMG president Don Deese, a manager at Fedsim and president of CMG, will chair a session on performance factors while Robert Morrison, program chairman and IBMer, will run one on monitoring and tuning aids.

"CPE Applications" will include two sessions — one chaired by Linda Wright of Suntech, Inc. and the other by Phil Kiviat of Fedsim — on systems and subsystem evaluation. "Structure and Design Considerations" will be considered in a session to be run by IBMer Herb Blomquist.

Tutorial sessions will touch on such subjects as data sharing, operational overview of queuing network models, performance management of a data center and an introduction to software physics.

People wishing to attend the conference may register ahead of time for $110. At the door, the charge will be $125 for the entire meeting or $45/day, Bishop noted.

Preconference registrations, including payment, should be sent to 1977 Sigmetrics-CMG VIII Advance Registration, attention Steve Sensabaugh, Tesdata Systems Corp., 7900 Westpark Drive, McLean, Va.

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'Speed' Enhances SAM File Use Under DOS/VS

FAIRFIELD, N.J. — The Speed package now available from Macro 4, Inc. was designed to provide greatly increased throughput for IBM 370s running under DOS/VS by speeding the user's disk I/O operations.

Speed works directly with disk files organized under the Sequential Access Method (SAM), but may impact an installation's entire operation even if SAM-based work is only a small part of its total workload, a spokesman claimed.

The package overrides the user's predefined block sizes; it reads or writes a full track or multiple tracks in one I/O operation. Typically this boosts throughput in SAM operations anywhere from 15% to 35%, the spokesman estimated.

Because Speed reduces disk arm movement and channel time, these resources are available to jobs working with Direct Access, Isam and Vsam files. Thus even jobs not using Speed directly may benefit from its presence, he contended.

Speed can operate in automatic, semiautomatic or selective mode. In all cases, however, the package can be turned on or off for the entire system or for individual patitions.

This is particularly important, the spokesman said, for installations where there is a danger of overcommitting memory at certain times of day.

Speed also supports 100 read/write retries in case of a problem.

Speed is available on a rental/lease basis in the $150- to $300/mo range depending on features selected. It is also available on a perpetual license, Macro 4 said from 376 Hollywood Ave., Fairfield, N.J. 07006.

Infonet Installs Cost Forecaster

EL SEGUNDO, Calif. — A cost-forecasting system that enables corporate planners to project and compare their manufacturing costs in 15 countries through 1982, Simcost II is now available on the Infonet remote computing network of Computer Sciences Corp. (CSC).

Arthur D. Little, Inc. of Cambridge, Mass., developed the management tool for the electronics, electrical and light mechanical industries. It was designed to help such areas as in investment planing manufacturing strategies, competitive costs evaluation and manufacturing sites selection.

Simcost II consists of a mathematical model and a data base that contains economic forecasts of the cost factors involved in the manufacturing operations of the target industries. The forecasts cover the period 1977-1982, the spokesman said.

Forecasts include both major industrial countries and less developed ones favored for off-shore manufacture, he explained.

The data base covers labor factors, including direct wages, taxes and fringe benefits expected, for 14 skill levels. Forecasts also cover worker productivity and production hours actually worked, the spokesman said.

Forecasts of transportation costs and prices of the 26 materials most widely used in the target industries are also part of the data base, as are forecasts related to some two dozen component or semifinished materials, he said.

Infonet customers subscribing to the service will pay a subscription fee to Arthur D. Little. The fee for first-time users is $25,000; for current subscribers to Simcost I, the fee is $12,000.

Arthur D. Little is at Acorn Park, Cambridge, Mass. 02140. CSC is headquartered at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

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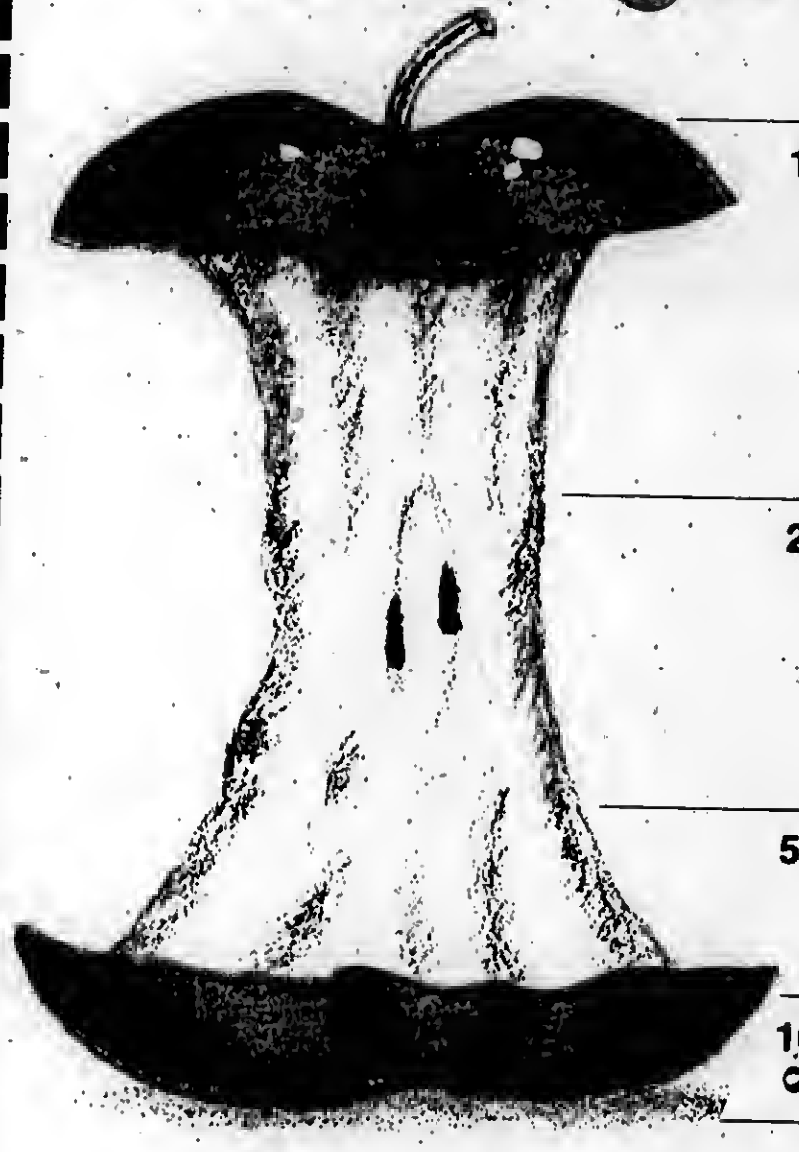

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Structural Complexity Factor in Data Base

By L.E. Towner
Special to CW

The recent emphasis on data bases has led to visions of immense pools of information providing total coverage of an organization. Such a data base contains data on many diverse applications and functions of the organization. The result can be mind-boggling.

When data base people discuss the size of data bases, the discussion gravitates to the volume of data to be contained in the data base. The term "very large data base" is generally used to define data volume. What few designers discuss and consider is the *scale* of a data base.

It is true that the data volume considerations are very important to the design and selection of data base software and that volume can make or break a data base management system (DBMS). The other side of the coin, however, is similar to the part of an iceberg under the water.

When first entering the data base arena, few potential users look at the end result of their endeavors, usually because the initial implementation of a DBMS is intended to support a specific application or functional area. The designers intend to expand into other areas "when everything is going smoothly." Unfortunately, this may be too late to prevent a costly and time-consuming design change.

The approaches used to design an integrated data base will vary widely depending on the overall scope and scale of the design. As more and more applications are added, the complexity of the structure increases.

The cost and time required to integrate each new application are represented by an inverted pyramid, expanding upward until the cost-effectiveness of integration is lost. A point can be reached where further integration is impractical.

Another problem of full integration is the serial nature of the integration process. While development of new applications is practical in parallel, final integration with the operational schema must be serial. Users rebel against the delays such an approach dictates.

Bad Dream

Initial experience developing a very complex, integrated data base bears this. A fully networked data base structure becomes very complex as many data relationships develop. Previously independent applications turn out to be highly interdependent and the nightmare begins.

A better approach is required to effect integration of large-scale data bases. Data volume becomes less of a limiting factor in data base design and implementation than the scope of coverage of the data base.

The purist approach to data base integration eliminates as much data redundancy as possible. The practical view is that some redundancy must be present to make processing efficient.

When many applications make use of common data, it is very difficult to maintain current operational use of that data while developing new uses.

A better approach seems to allow each application to treat all data as if it were the only user, while actually separating common data into a user-independent area. This technique permits parallel development of multiple applications while protecting the operational data base from inadvertent damage. Each application supports a planned-redundant record which points to the common data.

This approach has several pluses and minuses. The pluses include:

- Independent parallel development of applications.
- Reduction in schema structure complexity and pointer overhead.
- Increased safety of the operational data.

The minuses are grouped around a degredation in retrieval speed due to secondary accesses of shared data. The complexity of retrieval software increases, but the user's ability to access the data base increases also.

A data dictionary facility which recognizes synonym record names is essential to effective use of the described technique. Keeping control over the data base structure and track of where the data is located without a dictionary will require extensive supporting software. Such software will likely cost more to develop than the cost of the dictionary package.

Planned redundancy can be a powerful tool in the design of any integrated data base and may make dramatic differences in its ultimate goal, the support to the end user.

Towner is head of the systems Management Division, of the Naval Intelligence Processing System Support Activity in Alexandria, Va.

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Conversational Text Editing

Vtam Support Highlight of 'Mentext' Update

PALO ALTO, Calif. — Release 5 of the Mentext Conversational text editing and programming system from Mentel, Inc. includes several enhancements, the most significant of which provides Vtam support under the Mencom teleprocessing monitor, according to a spokesman.

Under Vtam basic mode, Mencom supports IBM 2740 models 1 and 2, 2741, 3735, 3740, 3767 and both local and remote 3270 terminals as well as "numerous other" communications units including Teletype models 33 and 35 and compatible teletypewriters, he explained.

Vtam record mode support for IBM 3270 and 3790 terminals operating under Synchronous Data Link Control (SDLC) protocol will be available shortly, he added.

Mentext facilities fall into five basic categories. Text management manipulates the contents of files made up of card images or print line images. Data set and catalog management displays data sets and their attributes as well as the contents of the catalog or a partitioned data set (PDS) directory.

Beyond that, the system manages remote job processing and provides an interactive language that can be used for such diverse tasks as JCL creation or letter writing, the spokesman claimed.

Mentext also supports document preparation facilities, including alignment, justification, pagination and indentations, he said.

The updated package can be used on IBM 360/370s under OS/MFT, MFT or the VS implementations.

Release 5 costs $25,500 to $35,000 depending on the operating system being used. Mentel is at 459 Hamilton Ave., Palo Alto, Calif. 94302.

Loan System Now Prints Federal Form

ORLANDO, Fla. — The Commercial Loan System package from Florida Software Services, Inc. (FSS) has been extended to produce federally required Commercial Loan Line Sheets, according to a spokesman.

The federal Office of the Comptroller of the Currency includes these Line Sheets as part of its bank examination process requirements, he said. They show current indebtedness and indirect liability status for selected customers, which may be printed on standard paper or special forms.

The enhancement also provides a report of indirect liabilities on delinquent notes. This report lists delinquent notes on a user-specified cycle for customers indirectly liable for each note.

The original application logic handled revolving credit, line-of-credit and partial advances on commitments as well as standard commercial loans. Written in Cobol, the package was designed for multibranch/multibank processing, the vendor said.

Under the FSS system, a "virtually unlimited" number of participations can be sold or placed against a note. Likewise, an unlimited number of collateral items can secure one or more notes, the spokesman added.

The package runs on Honeywell and Burroughs mid-range CPUs as well as IBM 360/370s. It costs $16,300 for IBM DOS and Burroughs users, $20,800 for IBM OS and $23,300 for Honeywell shops.

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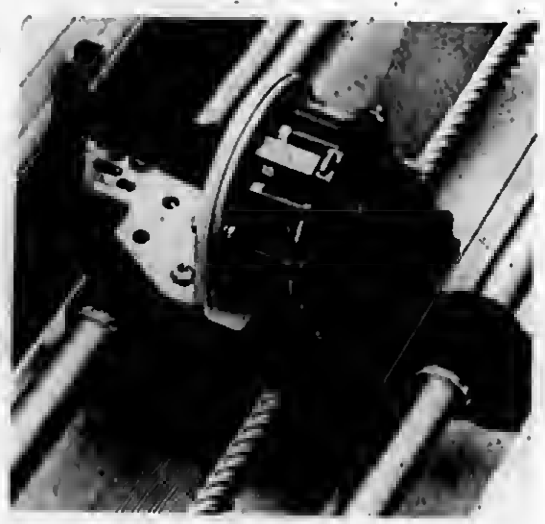

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Data Base Extensions Seen Top Products in '78

By Stephen L. Robinson
Special to CW

Data Base Corner

This is the time of the year for forecasts. Pundits are presently picking the winners in football, hockey and basketball. Seers are predicting which governments will fall, who will get married, who will be divorced and who will be assassinated.

Joining the ranks of the fortune tellers, I propose the following predictions for 1978:

- The vendors of data base packages will continue to expand their offerings of complementary software.

Data dictionaries, teleprocessing (TP) software, report generators and query facilities will lead the list. These packages will be closely bound with the data base packages. Logging and recovery, for example, will be synchronized between data base and TP packages. Report generators will utilize structure data such as imbedded and external pointers. Data dictionaries will be designed to operate in an active mode, although the burden of building the active mechanics will still be on the user. Query facilities will improve, but will still be rather primitive (i.e., not particularly English-like).

- Data base packages on

(Continued on Page 36)

Audit/Report System Uses IBM 3

WELLESLEY, Mass. — The EDP-Auditor/3 package from Cullinane Corp. is said to help nonprogrammers working with IBM 3s to generate both standard reports and audit-related analyses from their files.

Parameter-driven extraction support lets the user select data on predetermined criteria or sequential intervals. Bypass facilities allow the system to exclude unwanted records, a spokesman noted.

File matching functions allow users to work with two files in a single run, and sorting prior to use may be on as many as five data fields. Test runs can be used to verify data before complete file processing, he added.

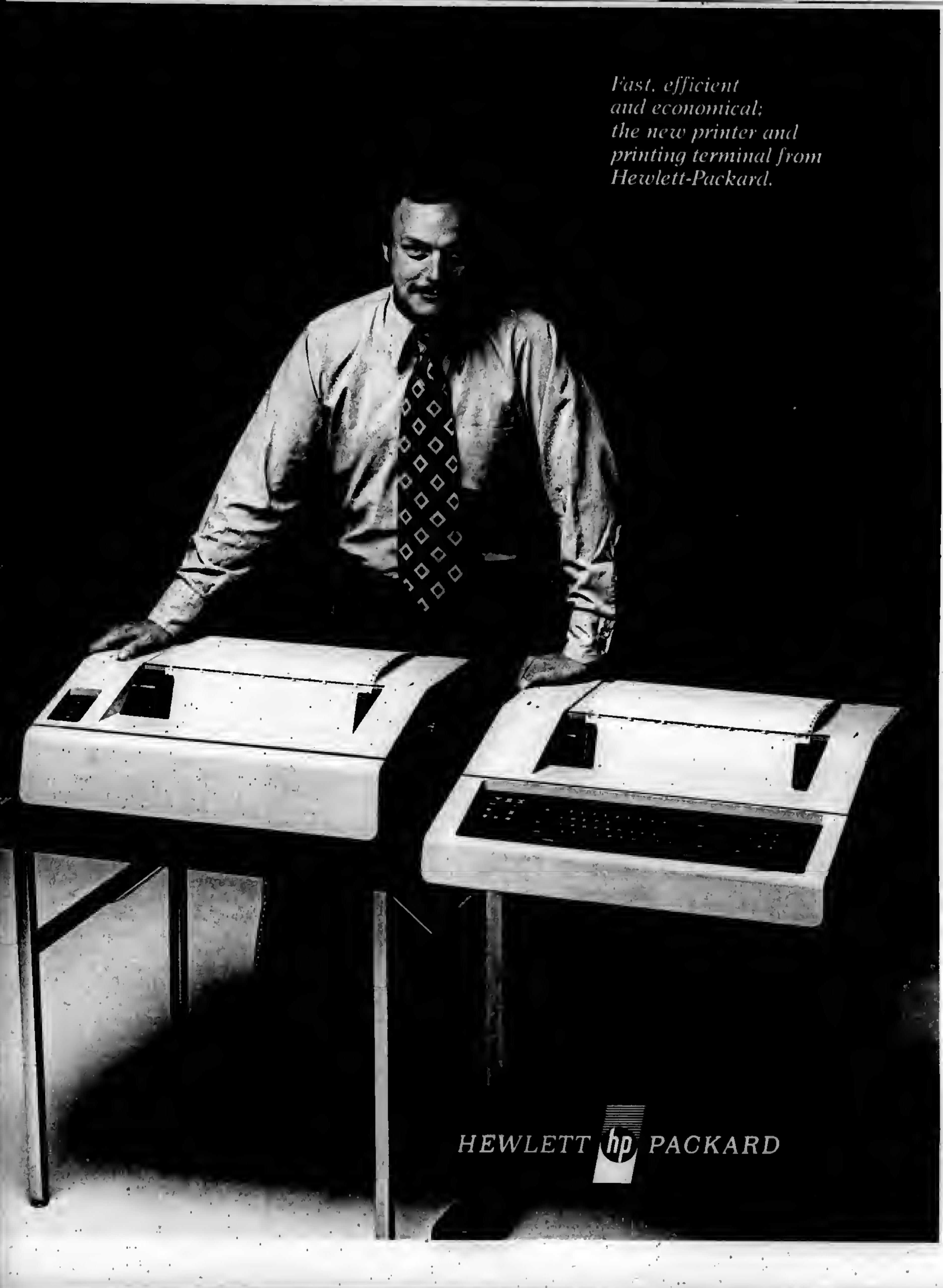
All basic arithmetic functions are available and the user may enter unique calculations for such operations as cross footing, extension checking and interest recalculations. The system can provide totals on the file and report level, the spokesman pointed out.

Functions for the auditor include aging of the data into a maximum of seven categories. Sampling of a file, including both proportional and attribute (frequency estimation) techniques, is built into the system, he said.

The preparation of balance and transaction confirmations and the creation of new files are also built in. Records selected according to random sampling or parameter extraction criteria may be written to a new card, tape or sequential disk file, the spokesman explained.

EDP-Auditor/3 is, in effect, an enhanced version of the Sys3audit package introduced last year by Computer Audit Systems, Inc. [CW, Oct. 11, 1976]. The rewriting and reintroduction at this time is part of an agreement with the originator, Cullinane emphasized.

Based on a System 3-oriented version of Cullinane's Culprit retrieval package, EDP-Auditor/3 is available for $7,500. Culprit/3, without the auditor-specific support, costs $5,000, Cullinane said from Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.



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'C' Compiler Runs on PDP-11

NEW YORK — A 'C' compiler for developing structured programs on Digital Equipment Corp. PDP-11s is available from Yourdon, Inc. The C language was developed at Bell Telephone Laboratories for Bell's Unix operating system, which runs on the PDP-11.

Yourdon's version of C runs under DEC's RSX and will be available under DEC environments. An Intel 8080 version of the compiler is anticipated early next year, the spokesman noted.

Because of the table-driven design of the compiler, much of its code is portable, he explained.

A combined tutorial and reference manual developed by Yourdon is designed so that the machine- or operating system-dependent parts of the system are segregated into a single chapter. The remainder of the manual, therefore, is a valid description of the portable aspects of C, Yourdon stated.

The C compiler costs $11,575 on a permanent lease basis. Users are responsible for acquiring the RSX softare; it does not come with the compiler, the spokesman added from 1133 Avenue of the Americas, New York, N.Y. 10036.

Data Base Extensions To Set Scene in 1978

(Continued from Page 35)

minis will be a hot item.

Hardware vendors, in their fervor to sell minis to small businesses, will provide a variety of data base packages. Codasyl-like and Total-like packages will lead the parade, primarily because of their minimal core requirements.

- Many small businesses will become disgusted with computers and data base.

Minicomputer vendors are quite aggressive in their relationship with first-time computer users. The result is a user who is often convinced that the minicomputer is indeed the panacea that big computers are not.

Disasters Will Abound

The availability of a data base package is frequently a major contributing factor to this rose-colored view of data and information processing. Disasters will abound and will be well publicized.

- At least half a dozen large installations will change data base packages.

They will cite poor performance, complexity of use, and inflexibility as the major factors influencing their decision. Most such switchers would be better off fighting (apologies to the makers of Tareyton cigarettes). Precedent exists to suggest the organizations will probably be unhappy with their second choice as well.

The reason is quite simple. Most such organizations have not committed to the development of a data base system; they are merely using the data base package as an access method. Without organizational changes to accompany the package changes, data base success will rarely be realized.

- The major data base packages will commence advertising that suggest they are relational and/or distributed.
- IBM will

  A. Hard-wire DL/1 commands.

  B. Announce a "Codasyl" package.

  C. Announce a relational package.

  D. Develop a Series/1 with a 1M-byte memory to run DL/1.

  E. Post record earnings.

  F. Any two of the above.

  G. All of the above (except F).

- At least two major software houses will announce data base packages.
- Papers will be published detailing the specifications for data base machines. Projects along these lines (e.g., Cullinane's) will continue, but don't expect to be able to buy one from your friendly vendor next year.
- Data dictionaries will begin to sell like hotcakes as more and more organizations recognize the value of taking an inventory of their existing systems.
- The Codasyl recommendations will once more not be accepted as a standard.

Robinson is an independent consultant, operating as S.L. Robinson & Associates in Morrisville, Pa.

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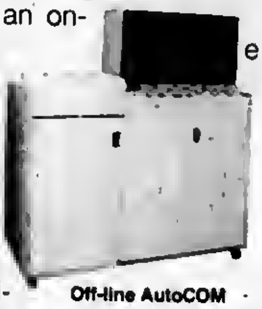
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November 15	Boston, MA	January 25	Detroit, MI
November 15	Kansas City, MO	January 31	Montreal, CAN.
November 30	Cincinnati, OH	February 7	Raleigh, NC
December 1	Columbus, OH	February 7	Philadelphia, PA
December 1	San Diego, CA	February 8	Milwaukee, WI
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Reloading Tough Work With Huge Data Base

By Dean G. Dardwin
Special to CW

SPRINGFIELD, Ill. – When the Illinois Bureau of Employment Security was commissioned to develop an on-line unemployment insurance claims processing system capable of paying claims in an accurate and timely manner, some type of data base management system (DBMS) was deemed necessary. The question was, which one?

While many factors were evaluated to determine which DBMS to use, there was still one unanswered question. The unemployment rate was climbing dramatically; no one really knew where it would stop. The DBMS chosen had to be able to store and allow rapid access to millions of data base records.

IBM's program product, IMS/VS, was selected. Both the data base and data communications functions were obtained. Eventually, the initial loading of the data base began. When the data base grew to the 11th 3330-11 pack, the load terminated.

Quite an Education

We received quite an education about Isam/Osam and relative byte addresses (RBAs). An RBA is a full word used by the access methods to locate a given physical record. Isam/Osam uses a signed high-order bit in the full word RBA, limiting the number of bytes per data set group (an IMS data base may consist of one to 10 data set groups) to approximately 2^{31}.

Two approaches were taken to solve the problem. First, a segment type that we expected to have high insert/delete activity was made a data set group by itself. Under certain conditions, a data set group can be reorganized by itself, without having to reorganize the entire data base.

Largest IMS Base

Second, as Vsam was available, a decision was made to utilize it. Vsam does not use a signed high-order bit in the RBA, allowing a maximum data set group size, in bytes, of approximately 2^{32}. After a one-week delay, the data base finally loaded successfully at 22 3330-11 packs. IBM informed us they knew of no physical IMS data base anywhere near that large.

What About Response Time?

Of course, there was much discussion regarding the response time we would be able to attain with such a large data base. After several months of tuning the hardware (370/168-MP), software (IMS/VS, IMS application programs, MVS, Vsam) and the teleprocessing network (300+ terminals distributed throughout the State of Illinois, 40 to 4,800 bit/sec remote lines), the 90th percentile response time, measured at the terminal, was under four seconds. Transaction volume varies from 50,000 to 100,000 per 10-hour day.

A Large Problem

While the response time is very satisfactory, the size of the data base still presents a large problem when reorganization is required. Reorganization is done by unloading and then reloading the entire data base. While the unload may run concurrently with on-line activity (no on-line updating is done), the reload may not.

The reload requires approximately 40 hours of elapsed time on the 370/168-MP system and is not restartable. Several reloads have failed due to tape I/O errors and other reasons, requiring the reload to be started from the beginning.

Everything considered, IMS/VS has proven to be the right DBMS for the situation.

Dardwin was previously manager of systems for the Illinois Bureau of Employment Security. Now he is vice-president of Chicago Data Systems, Inc., Chicago.

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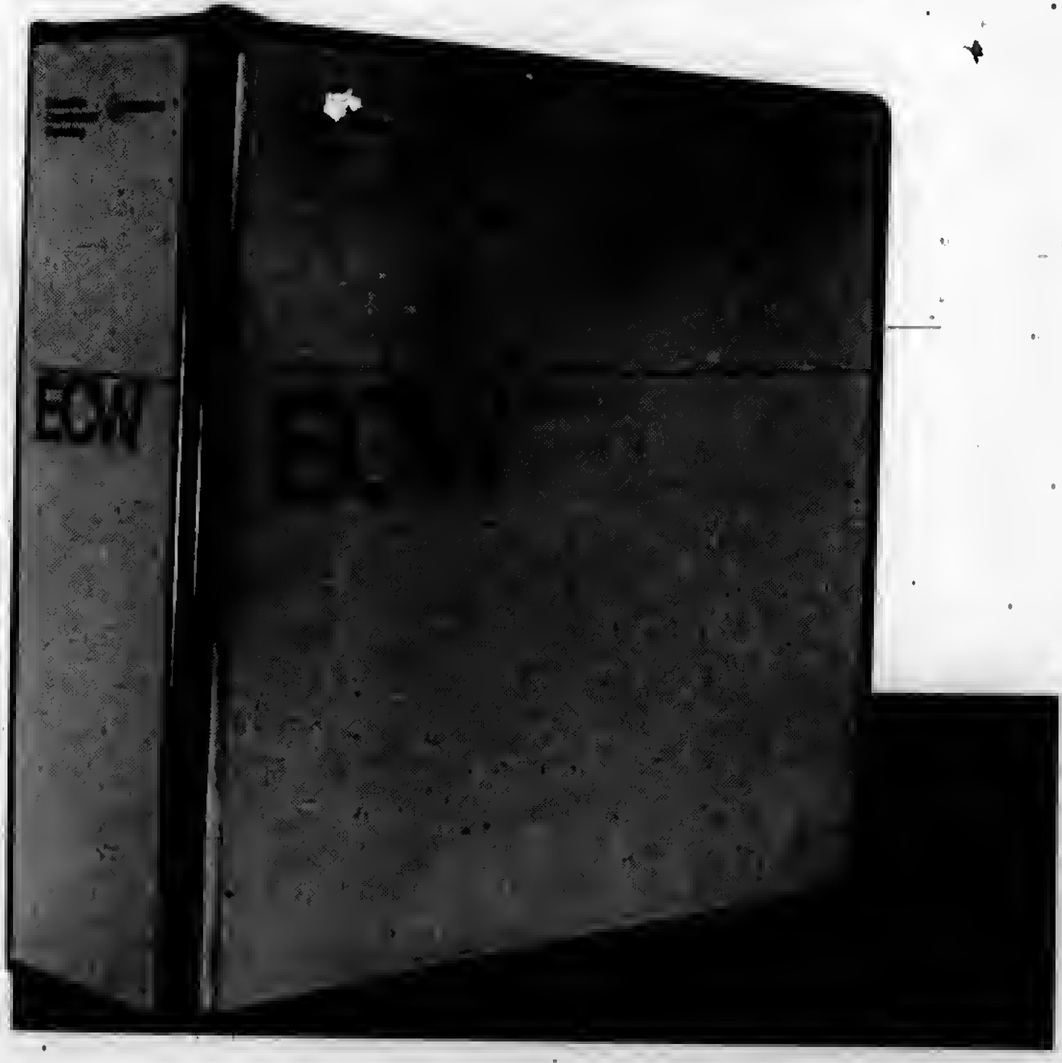

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SNA Designed for Flexibility, Users Told

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — IBM's Systems Network Architecture (SNA) is designed to permit terminals and controllers to share the same line and to enable one controller to access different applications simultaneously or sequentially, according to G.P. Fusco, director of distributed systems at IBM.

SNA enables many applications to share a single network and thus encourages the distribution of information and processing to geographically separated nodes in a network, Fusco told a session on distributed systems at the recent Info/Expo '77 conference.

It is important for users to be able to accommodate new carrier network offerings and many "beneficial changes" will occur in this area by 1985, Fusco predicted. Some of these network services will be handled at the electrical level and will not involve programming support, but others will require major changes in the host and distributed processor programming.

The SNA goal is to minimize the changes to products and applications programs in a way that provides the benefits of these new services and allows coexistence of many service types as well, he said.

Three Components

The concept of SNA includes three components — the link, session and data stream control. And these components fit together in layers with link control at the lowest level and data stream control at the highest. The higher SNA levels are insulated from the lower ones, making them less sensitive to changes in each other, Fusco explained.

The arrangement of levels allows high-level functions such as data base executions to be implemented above and independently of the lower SNA levels. The high-level functions, whether developed by the user or IBM, can then be designed independently of the network or its terminals.

Under SNA, the goal of link control is to effect transmissions between adjacent physical boxes as reliably and transparently as possible. IBM today supports about 15 different teleprocessing link controls, but Synchronous Data Link Control (SDLC) was chosen for SNA because it meets IBM's design criteria better than either Binary Synchronous (Bisynch) or start/stop protocols, he said.

SDLC conforms to the international standard known as Higher Level Data Link Control (HDLC) and has features that accommodate new networks. In addition, SDLC is compatible with existing link controls, which is considered "an absolute must in our architecture," Fusco said.

The object of session control is to provide flexible and transparent connections between end users which can be people communicating with programs or programs communicating with other programs. To accomplish this, SNA defines a single set of protocols for the logical connection of programs in a host system with a downstream controller or terminal. This logical connection is called a session, he said.

System availability is enhanced because the session part of SNA coordinates all recovery actions. Session control also allows better remote job entry (RJE) performance and yields good results when mixing RJE

(Continued on Page 40)

Avis Planning Modernization Of 'Wizard' Network Service

NEW YORK — Avis has plans to modernize its "Wizard" network and expand its services to third parties, according to August Kohler, the company's director of telecommunications, speaking at a recent conference here.

Development of the Wizard system started in August 1969 with 1,400 pages of specifications. It included engineering of a split platten terminal with Sanders Associates, 250 man years to rewrite IBM Pars software to accommodate front ends, and the creation of a nonstandard line protocol.

The system was running throughout 48 states by June 1973, and now the firm would like to expand its reservations capacity, move its DP center, create second-generation terminals, link North America and Europe, install terminals at travel agencies and initiate computer-to-computer communications from reservations made by airline passengers on board planes, Kohler said.

Currently, the system also serves Hawaii and has 1,000 terminals as well as 200 CRTs at the Tulsa, Okla., reservation center. The firm has no active plans to initiate Synchronous Data Link Control (SDLC), he added.

The Avis network serves several different

(Continued on Page 40)

Dataspeed 40/4 Display Station

NEW YORK — A single display station arrangement of the Dataspeed 40/4, designed for interactive communications has been introduced by AT&T.

The single display station is suited for remote or branch office locations requiring only a single keyboard display and printer. The keyboard display with integrated controller is designed for private-line systems using binary synchronous protocol, AT&T said.

The desktop Dataspeed 40/4 keyboard display includes two 1,920-char. buffers — one for the display and the other to accommodate an optional printer. The two buffers permit a message to be prepared on the display while a second message is being received on the printer. The printer is available for local printing under operator control as well as remotely from a computer, Bell siad.

The terminal includes includes options for Ascii or Ebcdic code, monocase or upper/lower character set, alarm, field blink and station addresses.

Customer applications for the single display station include the insurance, manufacturing and brokerage businesses, AT&T said.

It is expected that the first tariffs for the Dataspeed 40/4 single display station will be filed in some states in the first quarter of 1978. Monthly rate will range from $170 to $200/mo, an AT&T spokesman said.

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Teletype 43 Friction-Fed

SKOKIE, Ill. — Teletype Corp. has added a friction feed version of its 30 char./sec Model 43 matrix teleprinter.

The send-receive terminal prints at 10 char./in. on a 72- or 80-char. line and provides an original and one copy.

It retains the same basic features of its pin-feed predecessor including upper/lower printing and 10 or 30 char./sec operation.

The Model 43 friction-feed teleprinter with an EIA interface lists at $1,396. A receive-only model costs $1,253. Delivery will begin in the second quarter of 1978, Teletype said from 5555 Touhy Ave., Skokie, Ill. 60076.

Sanders Software Speeds Graphic 7 Tasks

NASHUA, N.H. — A software program that automates the necessary functions within the Sanders Graphic 7 interactive display system was introduced by Sanders Associates, Inc.

The software/firmware package, called GSS-4 (Graphic Support Software), turns the Graphic 7 into a ready-to-use system that requires no user knowledge of the terminal itself. It allows anyone familiar with Fortran to create, generate and manipulate simple or complex images on the display screen using a variety of input devices, the firm said.

GSS-4 distributes the processing tasks between the terminal and the host computer. Approximately 75% resides in firmware in the Graphic 7 read-only memory. The other portion, a small software package written in Fortran IV, resides in the host computer. Virtually all minis and any other Fortran-oriented CPU can use the GSS-4 package, a spokesman said.

GSS-4 lets a programmer communicate in user coordinates via Fortran subroutine calls rather than display coordinates. Because GSS-4 enables the Graphic 7 controller to generate images, manage the refresh file, etc., it offloads the central processor for other applications tasks, the firm said.

Subroutines Provided

GSS-4 provides approximately 50 subroutines, including such graphic functions as text, vectors, points, circles, lightpen, cursor, keyboard, scaling, windowing, scissoring, clipping, rotation and smoothing. The package also responds to operator devices such as keyboards, lightpens, and cursor control.

The GSS-4 is priced at $1,000 — a one-time charge for documentation — plus $2,500 for the Graphic 7 terminal firmware card.

Sanders Associates, Inc. is at Daniel Webster Highway South, Nashua, N.H. 03061.

SNA Designed For Flexibility

(Continued from Page 39)

and interactive processing jobs. This was previously not possible with IBM systems, Fusco said.

The data stream is aimed at controlling the data representation used betweenapplication programs and devices. The number of methods by which data and control information are formatted is kept to a minimum, while at the same time allowing extension to accommodate a wide variety of application requirements, he said.

In general, SNA relieves the user of many network management concerns and it is no longer necessary that users completely understand the increasingly complex information systems that assist them in their work, Fusco told the attendees.

Avis Planning Wizard Upgrade

(Continued from Page 39)

functions including reservations, transactions such as renting and returning cars, fleet inventory, station inquiry and administrative transactions.

Avis selected a 1,200 bit/sec terminal speed because of ease of maintenance, less costly modems and low line contention, Kohler said.

Multiplexers in Place

Where possible, Avis installed hard-wired multiplexers instead of concentrators. Private lines are used running at 4,800- and 7,200 bit/sec.

The reservations center in Tulsa has over 100 Wats trunks, all controlled by a Collins automatic call director. The center handles over 20,000 reservations a day, and the 200 terminals there are multidropped, he added.

Behind the terminals is a 1M-byte IBM 360/65 and a second machine for backup. Each has a Modular Computer Corp. 128K, four-port memory front end with its own fixed-head disk. These cycle steal on the 360, he said.

Non-Standard Ascii

Avis uses Ascii code, but the line protocol is not standard, because tradeoffs had to be made with the hard-wired terminal, Kohler indicated.

The Wizard terminals, instituted in 1969, were the precursor of intelligent terminals and, although hard-wired, can be downline loaded to accommodate the 112 transactions, which each have their own sequence of data collection.

Kohler said the network may lose one concentrator a month. There can be six to seven line failures a day, which can mean up to 18 terminals out of commission for up to four hours, he said.

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With Printers, Cash Drawers

Mini-CRTs in Showrooms Do POS, Inventory

BETHESDA, Md. — A Maryland systems house has found a new use for the miniature CRT computer terminal. Interfaced with small printers and cash drawers in a chain of catalog showrooms, the system doubles as a point-of-sale terminal, desktop catalog and inventory updater.

Applied Systems Corp. has installed the system in W. Bell & Co. showrooms in the Washington, D.C. area. The system also supports showrooms in Atlanta, Houston and Baltimore.

"We chose the Informer Model 301 terminal which has a mini-CRT (6-in.). video display screen and a very compact keyboard," Nick Demos, project manager for Applied Systems, said. "The terminals sit out on jewelry counters or pickup counters and Informer's design is aesthetically very pleasing. Size is a consideration, too. We'd rather not take up counter space. And we didn't need the large-screen capability for this application."

Demos said Bell showroom salesclerks use the terminals as cash registers.

"When they're in a point-of-sale (POS) mode, they just enter the five-digit and one-letter catalog code. The computer comes back with the price and description of the product and displays it on the screen. Upon command the system calculates the sales tax and totals the transaction.

"The clerk then enters the method of payment, such as credit card, exchange voucher, charge or cash amount. The system writes on the printer attached so the customer gets a printed receipt," he explained.

Demos said the system installed by Applied Systems for the Bell showrooms also uses an inventory status mode where an item number is entered and the status and price are displayed on the screen. Showrooms may also crosscheck the inventory quantity in all other showrooms and warehouses.

Clerks can use the system to locate a substitution item when a particular product is out of stock, Demos said. By using the terminal in a different mode, vendor receipts are recorded. The inventory file is updated on-line and records are retained for sales analysis and other uses.

"The best part about the system is that it is totally interactive," Demos said, "That's a little different from the typical POS situation where everything is batched at the end of the day."

Applied Systems also developed a "remote concentrator" or controller in each showroom — actually a multiplexer — to enable showrooms around the country to use the host CPU, yet minimize the high cost of telephone circuits.

"Up to 16 Informer terminals with printers can be tied in to one concentrator," Demos said. "The Bell showrooms use from five to 16 terminals in each showroom. This way, all the terminals in a store can transmit over one circuit. The controllers share or "multidrop" on a telephone circuit so three circuits handle nine showrooms."

Bidirectional Printer From HP Controlled By 'Smart Algorithm'

PALO ALTO, Calif. — A printing terminal which features a bidirectional printing path that reportedly is controlled by a "smart printing" algorithm has been introduced by Hewlett-Packard Co.

Terminal Transactions

Leading and trailing spaces on the terminal are detected and ignored, causing the head to move directly to the next material to be printed, HP said.

As the printer looks ahead in the data stream, it detects the spaces embedded within a line; when 10 or more spaces are found, the print head moves to the next printable character at a speed of 45 in./sec, according to a spokesman.

The price of the 2635A printing terminal is $3,450, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

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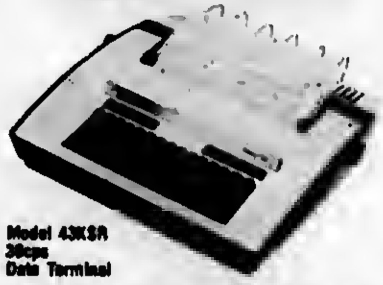

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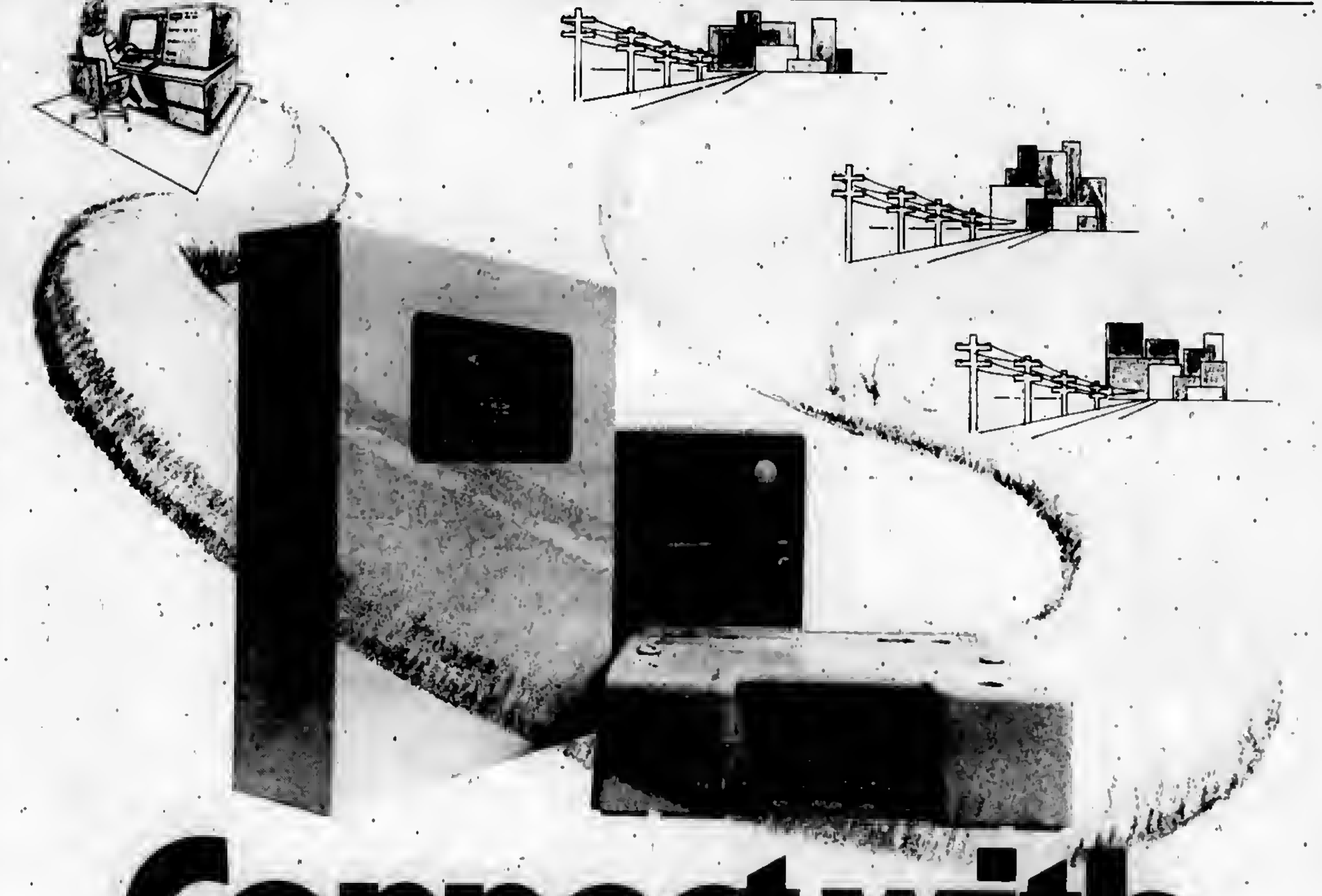

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EFT Device Guides User

BEDFORD, Mass. — Concord Computing Corp. has introduced the 770 transaction terminal, the second in a series of electronic funds transfer (EFT) terminals for users of NCR and IBM terminals.

The 770 is designed for customer entry of financial transactions at retail points-of-sale and bank branches to supplement NCR 279 and IBM 2260/2848 functions, according to a spokesman for the firm.

Self-Test Diagnostics

Some of the 770's features include prompting and transaction printing with a minimum of host CPU activity; and a self-test diagnostic mode to check all display lamps, the printer mechanism and the digital display, according to the spokesman.

It is equipped with a full alphanumeric printer, a 10-key keyboard, 12 transaction keys, 16 prompting messages, a magnetic stripe card reader and the microprocessor, Concord stated.

Concord's present design allows communications with a host CPU in either NCR Corp. 279 or IBM 2260/2848 protocols asynchronously at 1,200 bit/sec.

The financial terminal is priced between $2,150 and $2,450, Concord said from 7 Alfred Circle, Bedford, Mass. 01730.

DDP Capability Available For Basic/Four Model 400

IRVINE, Calif. — Users of Basic/Four Corp. small business systems can now link their computers to each other or to larger, host mainframes to form distributed data processing (DDP) networks, according to a company spokesman.

Basic/Four recently equipped its Model 400 small business system with a bisynchronous communications capability with 2780 and 3780 compatibility, the spokesman said. The Model 400 system previously had only synchronous communications capability.

The newly available communications option also allows Model 400 systems to interact with any non-Basic/Four mainframe equipped with bisynchronous capability, the spokesman added.

To add DDP capability to a Model 400 already in the field, users need only install a bisynchronous communications board, expand their operating system by 4K to 5K bytes and write additional applications programs, the company said.

Basic/Four is aiming its distributed processing systems at first-time DDP users whose annual revenues range from $25 million to $250 million, the spokesman explained. In a distributed network, applications for the Model 400s include inventory control, accounts receivable and payable, payroll, general ledger and other standard accounting functions at manufacturing firms, wholesalers, hospitals and insurance companies.

A minimum Model 400 configuration with bisynchronous capability consists of one video display terminal, a 10M-byte disk unit and a 165 char./sec printer, the spokesman said. With a minimum main memory of 24K bytes, the systems cost $36,900 each or $24,000 in OEM quantities, the firm said. Basic/Four can be reached through P.O. Box C19550, Irvine, Calif. 92713.

Columbia Slates Network Topics

NEW YORK — A quantitative approach to data communication network design is the focus of "Computer-Communication Network Design and Analysis," a three-day seminar to be presented by Columbia University. It will be held Jan. 16-18 in New York City; March 13-15 in San Francisco and May 15-17 in Chicago.

The seminar is said to offer a practical exploration of network design aspects that are applicable to most computer and multipurpose data network.

The seminar leader is Dr. Mischa Schwartz, Professor of Electrical Engineering and Computer Science at Columbia University.

For registration information, contact the New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

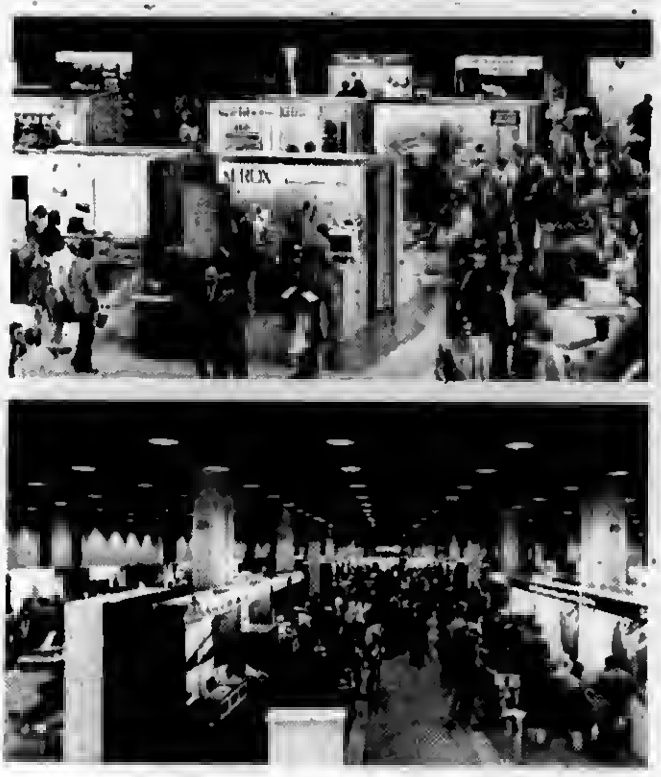
Digicom Introduces Mini-Floppy Drive

SAN JOSE, Calif. — A microprocessor-based mini-floppy disk drive that emulates paper tape and magnetic tape has been introduced by Digicom Data Products, Inc.

The Digidisk system allows the operator to prepare and edit messages and data off-line and then transmit them through the optional built-in acoustic coupler. The unit will reportedly operate with any data communication printer or CRT terminal.

The Digidisk with RS-232 interface costs $1,199; with built-in 300 bit/sec originate-only coupler, $1,299; with a built-in 1,200 bit/sec 202-compatible coupler, $1,699.

Digicom Data Products, Inc. is at Suite 108, 1440 Koll Circle, San Jose, Calif. 95112.



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Storage Medium of Future?

Photoplate Disk Features High Density

By Frank Vaughan
CW Staff

PALO ALTO, Calif. — Magnetic storage and data processing are seemingly inseparable, yet if Jerome Drexler, president of Drexler Technology, has his way, the photoplate disk will be the storage medium of the future.

The Drexler photoplate disk stores data in the form of 1-micron dots (one millionth of a meter) in a homogeneous, dispersed emulsion of cubic silver halide crystals. Large glass sheets are coated with this emulsion, from which the disks are cut.

In the past; photographic disks had limited applications for data recording because recorded errors could not be detected until after the photoplate was processed. However, Drexler feels his technical staff has overcome this difficulty with a method which will permit the instant detection of recording errors, allowing corrections to be made before the photographic development of the recorded disk.

One of the main attractions of photoplate technology as a storage medium is the potential storage density, Drexler noted. By way of comparison, the data stored on 10 magnetic platters (each about 14 inches in diameter) of an IBM Corp. 3330 disk drive totals 100M bytes, he added. The same amount of data could be recorded with a laser on one 4-inch photoplate disk.

As another means of comparison, Drexler said that a single 12-inch photoplate disk would have the resolution to store 900M bytes of data.

In the system Drexler envisions, a read-only memory (ROM) photoplate disk can be used to store a CPU's operating system and a variety of assorted software programs. Multiple copies of the prerecorded "software disks" can be reproduced using inexpensive photogrpahic reproduction methods and can be distributed to users by vendors at a minimal cost.

Of primary interest to Drexler are the operating systems and associated software programs, which range from 25M bytes for small systems to the 800M bytes of a "supercomputer." For 800M bytes, he proposes an 11- or 12-in. diameter disk which would require a playback unit of about the same size as the commercial video disk players due to be on the market this spring. For the 25M-byte situation, Drexler proposes a mini-disk only 2 in. in diameter which could store and retrieve the data in a compact package, which could be tucked into a corner of a minicomputer package.

There are many potential user advantages to photoplate disk technology, Drexler noted. Since photoplate disks can be replicated by photographic means at low cost, the end user will see these savings passed on by the vendor. The publishing of many different programs on photoplate disks could lead to standard formatting and greater uniformity and efficiencies, he claimed.

Programs stored on photoplate disks are tamper-proof because the data is not erasable, and older programs can be saved without the problems and costs of annual regeneration, he said.

CPU availability is not lessened since the operating system can be read immediately and directly from the photoplate disk, he contended.

The introduction of errors by transferring data between magnetic tapes and disks are eliminated, he claimed, as are errors or data losses caused by electrical power disruptions.

Is photoplate technology going to be the software medium of the 1980s and 1990s? No one knows for sure, but Drexler is doing his part by offering his Romp photoplate disks to potential manufacturers of photo-optical computer memory systems in the hopes that they will become a way of life for users of the future.

Univac Offers Disk Subsystem For 1100, 90/80 Series CPUs

BLUE BELL, Pa. — When Univac recently announced several new systems [CW, Oct. 31], it also introduced a "Winchester"-style disk subsystem for both the 1100 and 90/80 series and a pair of special features for the 1100/80s.

The Univac 8450 disk subsystem is comparable in operation to IBM's 3340 subsystem. It uses sealed modules that include both a nonremovable read/write mechanism and multiple disks with recording surfaces.

In its maximum configuration, the 8450 is said to provide more than two billion bytes of on-line storage for 1100 series systems or 4.9 billion bytes for 90/80 users. The minimum setup, with a control unit and two drives, provides 672M bytes for the 90/80 or 134M words for the 1100/80.

Purchase cost of the minimum configuration is $66,000, while a gross lease cost is $1,616/mo under a five-year plan.

A fixed-head option, also available, would add $13,600 to the purchase cost or $224/mo to the lease cost, he noted.

The 110 special features include a Scientific Accelerator Module (SAM) scheduled for delivery in 1979, and a Subsystem Availability Module (SAU), expected sometime next year. SAM increases the speed of floating point and extended fixed point arithmetic instructions, the spokesman explained.

SAU enhances system resource availability by providing central control over the physical paths from peripheral subsystems to I/O units, he added.

SAM bcan be purchased for $124,235 or leased for $2,375/mo while SAU costs $79,360 or $1,675/mo under a lease plan.

Prices Lowered On TI 810 Printer

HOUSTON — A price reduction on the Model 810 microprocessor-controlled printer and the availability of international character sets was announced by Texas Instruments, Inc.

TI reduced list price of the printer from $2,250 to $1,895. The maintenance rates were also changed from $39.50/mo to $24/mo.

Lease rates were also reduced. The 90-day rate was changed from $165/mo to $145/mo. Rates for one- through four-year leases were reduced to $15/mo.

In addition, the firm released Katakana, Danish/Norwegian, Swedish/Finnish, German and UK character sets. Each full set (upper and lower case) is priced at $100, while the limited character set (upper case only) is priced at $50 from Texas Instruments, Inc. P.O. Box 1444, M/S 784, Houston, Texas 77001.

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System Compares, Correlates Energy Data . . .

ATLANTA — One of the nation's major electric utility systems is using a mainframe CPU to provide cost comparisons for total electric vs. split-energy systems in planning residential and commercial construction projects.

Southern Company Services, Inc. here provides technical and other specialized services to its parent firm, The Southern Co., and Southern Co.'s four electric utilities in the Southeast: Alabama Power, Georgia Power, Gulf Power and Mississippi Power.

If a Gulf Power sales engineer in Pensacola, Fla., asks for information to calculate power requirements for heating and cooling a new office tower, such factors as square footage, insulation, number of windows and similar variables planned for a building project are fed into Southern Services' Honeywell Information Systems Model 66/40 CPU in Atlanta. Data from similar construction projects is stored in memory. The system does its comparisons and correlations and in a matter of seconds provides architects and engineers with recommendations for achieving maximum economies in methods and materials.

Southern Company Services also uses its system for economic research and rate studies. Escalation of fuel costs and operating expenses has prompted a need for continual review of authorized rate structures, according to company officials. At the time a utility company files for rate adjustments, a complete analysis of costs and other financial data is essential.

Benefits of the system have surpassed the company's expectations, according to Charles A. Murdock, assistant data center director. The company spent a year and a half evaluating computer systems before choosing the 66/40 to take over its major time-sharing requirements.

Complex DP Center

The firm's data center has been described as one of the 10 most complex of its kind in the world. Used principally in accounting and engineering problem-solving assignments, the system occupies 18,000 sq-ft. of space and processes some 401,000 jobs annually. The data center employs 500 technical, clerical and administrative personnel.

HIS' $2 million entry into what had been exclusively "IBM territory" at Southern Company Services was in response to special requirements set forth by the service organization.

The company needed a computer "with great reliability and the capacity for smooth program conversion from the outside services then provided by General Electric (GE), according to Murdock.

"We needed program conversion with an absolute minimum of impact on our computer users," he explained.

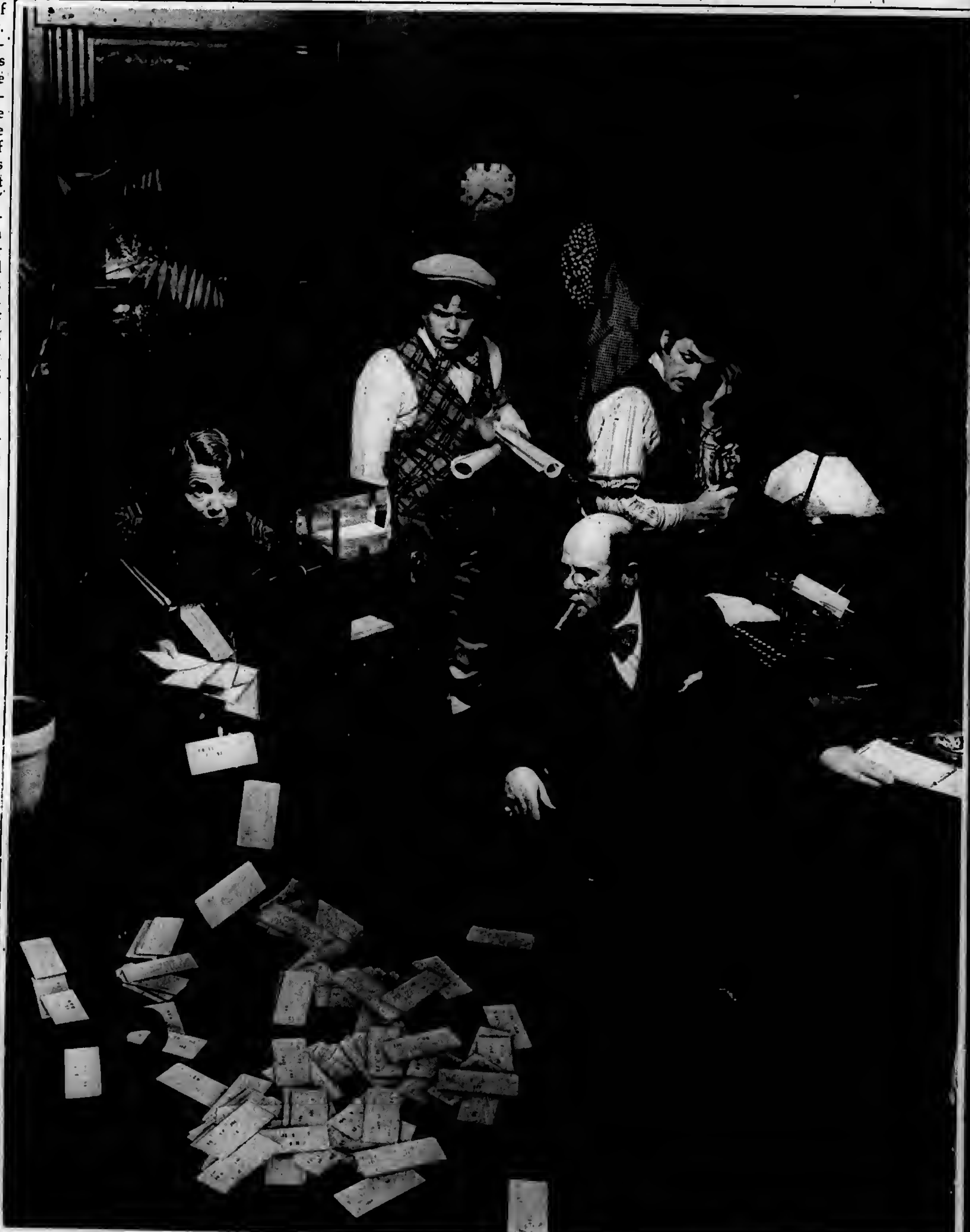
Centralized Operations

The company's data center, he added, centralized all computer operations in 1971, except for time-sharing problem-solving (what Southern Company Services calls interactive services) which GE, primarily, was providing. One attempt at "bringing the outside services in-house" was the installation of IBM's TSO system, but Murdock said "insufficient computer capacity and incompatibility with certain problem-solving aspects of the GE system" prompted Southern to explore other systems.

"During conversion to a new system, we knew it would be vital to continue day-to-day problem-solving services that our users expected and at the same time preclude the imposition of a high learning curve to the users' understanding of the new system," Murdock said.

Southern Company Services officials traveled to several

(Continued on Page 45)



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(Continued from Page 44)

locations in North America to examine a number of different systems. Among them were HIS installations at Bell Telephone of Canada, General Motors and Chesapeake & Potomac Telephone. At these three stops, Murdock noted, Southern Company Services found "overwhelming system reliability."

"An independent consultant confirmed our own findings," he said. "The Level 66 is a very cost-effective system."

Fall Installation

With a go-ahead from Southern Company Services, in the fall of 1974 HIS installed a computer at its Atlanta marketing headquarters to permit the company to conduct a second phase of its feasibility study. The CPU was linked to selected Southern users, who employed its services alternately with those of the General Electric system.

Satisfied with the demonstration, Southern Company Services contracted for third-party lease of the Model 66/40, and installation began at the data center in August, 1975. The agreement with HIS stipulated that program conversion be completed by Nov. 1. During the three-month period that ensued, 3,700 programs and 4,000 files were connected from the GE system to the 66/40.

System Links

The system is used to support problem-solving throughout the four-state southern electric system. Presently, it is linked with 58 terminals, and it handles time-sharing work for more than 400 users. In addition to remote system users, a small nucleus of Southern personnel located at the parent company headquarters is linked to it.

Departmental and system users include civil and distribution engineering, rates, economic research, environmental, sales, communications, planning, budgeting and statistical and financial services departments. To date, the computer has served a monthly peak of 25 concurrent users.

65% Savings

Murdock cited economic savings "in incremental costs" of more than 65% compared with costs of equivalent services provided previously by the GE system (incremental costs of less than $50,000 with HIS compared to $160,000 with GE).

"This financial consideration," he noted, "was a prime motivator in our original decision to convert from the outside services."

93% Replacement

Southern's objective is to replace all but 7% of the external time-sharing services with an in-house system, he said.

As for future applications, company officials explained that "a seven-year plan will develop the full potential of the system." Special developmental areas lie in financial, budgeting and marketing services. Word-processing, text editing and "interactive graphics" (engineering and structural design services) were cited as specific areas of interest.

Future Expansion

Southern Company Services officials foresee an expansion in the number of terminals to member company users. Beyond general office points now served at Birmingham, Pensacola, Gulfport (Miss.) and Atlanta, divisional and district office points in such places as Athens, Columbus, Macon and Rome, Ga., and in Alabaster, Ala., will be served. Up to 300 terminal points are in the long-range forecast.

The system currently includes 256K words of main memory, 10 disk drives, three tape drives, 1,050 card/min reader and a 1,200-line/min printer.

BASF invented magnetic tape back when IBM's growth was still in the cards.

Back in 1932, when Ronald Colman starred in *Arrowsmith* and a pound of sirloin cost 29 cents, BASF invented magnetic tape . . . the forerunner of all of today's high-density data processing media. The state of the art has progressed immensely since then, and we do have some well-known competition. That's why, at BASF, being first has to take a back seat to being best. And we've spared no effort to be the best. Over 1,500 scientists and engineers are involved in the BASF corporate research and development program, which operates with an annual budget of $200 million. The results of this effort can be seen in the performance of all BASF magnetic products. At BASF we realize that it's not how long we've been around that makes the difference; it's what we've done with our time. Ask our customers . . . most people who choose BASF make it their only choice. BASF Systems, Bedford, Massachusetts 01730.

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Groff Outlines Procedure

Vendor Choice Called Complex for Data Entry

By Frank Vaughan
CW Staff

NEW YORK — The subject of vendor evaluation is as complex and controversial as any other subject in the data entry profession, according to a workshop leader at the first annual Data Entry Management Conference, held here recently.

Requirements fall into two categories: absolute — those requirements that the user must achieve; and desirable — those requirements that, in addition to the absolute, would be utilized, according to Thomas E. Groff, director of systems and data for Pratt & Lambert, Inc. of Buffalo.

The budget for a specific subject also falls into two categories, the dollar budget and the time budget, Groff said.

The dollar budget is where the worth of the project is established as it relates to the dollar investment the user can afford to make. The time budget does not pertain to the span allocated for project completion, but rather to the time spent pursuing the vendor, he said.

Managers must determine the critical value of the project because if what the manager intends to accomplish can have a dire effect on corporate stability, then vendor performance becomes critical, Groff pointed out.

The manager should look and reconsider his own in-house facilities. Possibly something can be added to accomplish the goal well within the budget. If not, selection of prospective vendors should begin, he said.

Groff suggested users maintain a file of literature received from vendor visits and not try to bar the door to vendors.

If he can, the manager should subscribe to a DP hardware/software updating service, he said, noting the manager should research all reference material at his command to finally select those vendors whose facilities appear to fit the user's requirements.

Finally, Groff recommended, inform the selected vendors not only that they are in contention, but against whom they are competing.

Financial Report

The next step, according to Groff, should be to solicit a financial report or Dunn and Bradstreet report on the vendors to ensure they will be on the scene in the upcoming year.

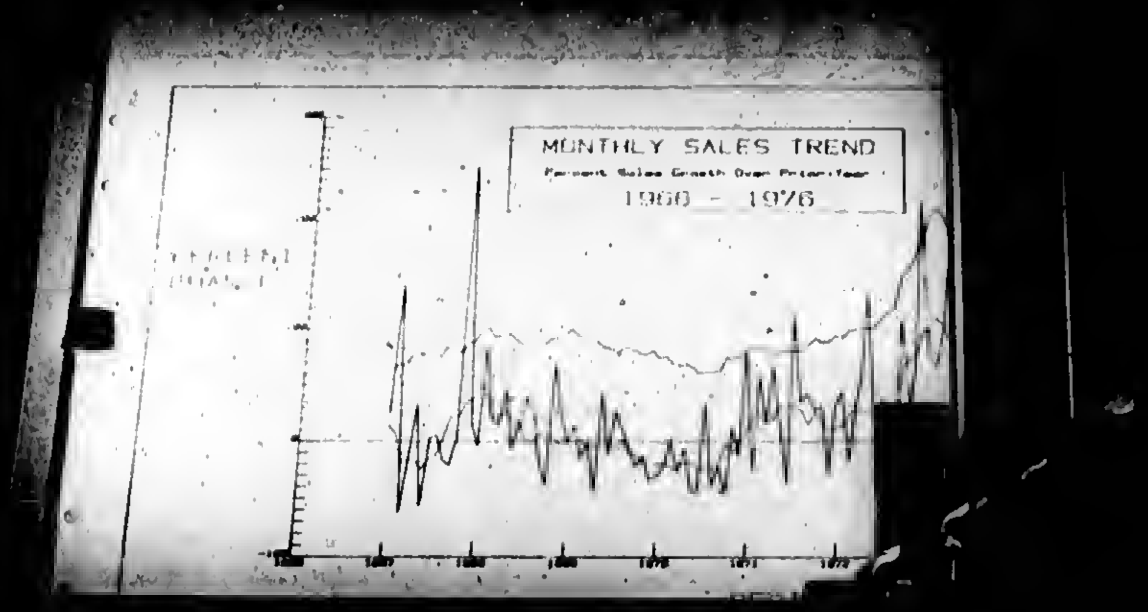
Obtaining blank copies of contracts and warranties from the vendors is another means the manager can use to evaluate vendors, the session leader noted.

Request a list of vendor customers in your area and don't be afraid to visit these other users, Groff told the workshop attendees, but he cautioned, the manager must be sure that he is the one who selects the customer from the vendor's list and that he contacts several customers if possible.

When the time comes to consider requesting bids, the vendor field should be narrowed down. Each vendor selected should be provided with a request for quote.

The manager can then review the quotes, making sure that the vendors have quoted in accordance with the request, and that the quotes and the contracts are compatible. Then the manager can select the vendor and place the order, Groff said.

From only 90 seconds of transmission time, HP's new graphic plotter drew this chart in four colors, picked up its pens, and put them away.



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Getting this kind of graphics from complex computer data has always been a long drawn-out problem. Now, arcs, circles, dashes, dots, and alphanumerics—routine shapes that normally take lengthy programs—are quickly drawn by single commands.

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DEC Packages, Cuts Price Of Six PDP-11 Systems

MAYNARD, Mass. — Digital Equipment Corp. has packaged eight of its systems into standard configurations which the firm said it is offering at price reductions of 8% to 21%.

Products affected by the price cut were the PDP-11/70, 11/60, 11/34A, 11/34, 11/04 and the 11/03.

The PDP-11/70 CPU with RP06, 176M bytes of disk storage, TE16 magnetic tape load device, 256K bytes of core memory and choice of four operating systems has been reduced 14% to 20%.

The price of the PDP-11/60 with dual 14M-byte RK06 disks for storage and load, 128K bytes of MOS memory and choice of five operating systems has been cut 8% to 10%.

The PDP-11/60 with a 5M-byte RK05F fixed media disk and 2.5M-byte RK05J removable media disk, 64K bytes of MOS memory and choice of five operating systems can be purchased for 8% to 13% less than before.

The PDP-11/34A with dual RK06 disks, 96K bytes of MOS memory and choice of four operating systems was reduced 8% to 15%.

The price of the PDP-11/34 with RK05F and RK05J disks, 64K bytes of MOS memory and choice of four operating systems has been cut by 17% to 21%.

The PDP-11/04 with RK05F and RK05J disks, 64K bytes of MOS memory and choice of two operating systems is offered at a savings of 19% to 20%, while the PDP-11/03 with RK05F and RK05J disks, 32K bytes of MOS memory and RT-11 operating system has been reduced by 16.7%.

The PDP-11/03 with dual RX01 floppy disks, 32K bytes of MOS memory and RT-11 operating system now costs 18% less than it did previously.

Cabinet Holds Tape Cartridges For IBM 5100, 3M Drives

NEW YORK — A cabinet for storing and retrieving 1/4-in. tape cartridges used with IBM 5100, 3M and other drives has been announced by Printcraft Systems, Inc.

The unit is self-stacking and interlocking in design. Each drawer has adjustable dividers and follow blocks, with a storage capacity for 72 cartridges.

A one-drawer unit costs $85, the two-drawer model costs $125, and the lock and key costs $12 from Printcraft at 11-17 Beach St., New York, N.Y. 10013.

Multiprocessors Suggested For Users With Big Loads

Esther Surden
CW Staff

CUPERTINO, Calif. — Users with a large transaction processing load and the need for a system that is reliable have a limited number of options. Typically, such a user can contract with a systems house to design a multiple processor configuration using standard minicomputer hardware.

Another alternative is turning to a firm specializing in supplying such a system. Going to a vendor who specializes in multiprocessor systems has two advantages, according to Sam Wiegand, vice-president of marketing for Tandem Computers, Inc. here, maker of the nonstop multiprocessor system.

First, the user gets a standard product, not one that must be specially configured each time, and benefits from not having to worry about initial system development, Wiegand said. Secondly, users can take advantage of already developed runtime software for their systems.

Tandem's systems range in cost from about $100,000 to $1 million. They are configured from common modules and differ only in the number of processors, controllers and other devices used in the systems.

The systems can be expanded at the user's site without even shutting the systems down for critical applications, Wiegand noted. To do so, the user must have ordered the

(Continued on Page 52)

System/4 Handles Card Reader

By Jeffry Beeler
CW Staff

NEW YORK — Univac's BC-7 small business system was reintroduced in modified form by Decision Data Computer Corp. (DDCC) at Info '77 here recently.

In most respects, the System/4 and the BC-7, which were originally designed by the two firms in a joint development project, are nearly identical twins, according to John Puchon, Decision Data's System/4 director.

The Decision Data system, however, was designed to accommodate card readers like its own 9610 Interpreting Data Recorder and printers as fast 600 line/min, while its Univac counterpart lacks this card-handling capability and can operate with printers no faster than 250 line/min, Puchon said.

This difference in peripherals makes the System/4 suitable for first-time users of disk-based systems and for IBM System/3 users who would otherwise upgrade to an IBM System/34 but can't because of that computer's inability to accommodate card readers, he said.

A minimum System/4 configuration consists of a CPU with 48K bytes of main memory expandable in 16K-byte increments, a 2M-byte diskette unit, one workstation and a 120 char./sec bidirectional printer.

The system can be expanded to incorporate a 300- or 600 line/min printer, multiple workstations, a 30M-byte disk unit and a 96-column data recorder, according to the firm.

The computer's System Control Language uses two applications languages — RPG-II, which Puchon said "is more than 99% compatible with IBM," and Ideal, a data base management language that reportedly executes commands with simple English verbs.

(Continued on Page 49)

User Overloads, Not Upgrades

CHICAGO — It's not often in this age of inexpensive minicomputer CPUs, cheaper memories and less costly disk drives that a company pushes its system to capacity. Usually the alternative of upgrading is much simpler.

The Dietzgen Corp., however, is using two small business systems to their limit, according to Bill Wheaton, vice-president of operations.

"Actually, we are not having as many problems as we anticipated," Wheaton said. The company purchased the two Basic/Four Corp. Model 400 minicomputers knowing that it was going to "give them quite a workout."

Basic/Four was "reluctant to sell them to us in the beginning." Dietzgen "overloaded deliberately at the time we installed the systems."

Overloading is working well, Wheaton reported. The two systems are being used in an on-line, real-time teleprocessing application. Located at the Chicago headquarters of the firm, the systems are connected via telephone lines to CRT terminals and printers at six remote warehouse/manufacturing locations. The systems supplement the activities of an IBM 360/30 batch-oriented

(Continued on Page 49)

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User Deliberately Decides to Overload Systems

(Continued from Page 47)

system, also located in Chicago.

Dietzgen purchased the systems to achieve more efficient order entry, inventory control and better customer service, Wheaton noted. The systems have done this and also paid for themselves in the first nine months of operation, allowed a 25% reduction in inventory levels in the first year and resulted in a manpower savings of 12 people, according to the vice-president.

When originally considering the need to perform these applications, Dietzgen thought about upgrading the IBM 360/30 to a larger IBM system, but "it was just not economically feasible," Wheaton recalled. The type of system offered as an upgrade was not compatible to the firm's on-line processing needs, he explained.

So the company surveyed the mini area and examined seven alternatives. "Basic/Four had the least expensive system that provided us with a whole package," Wheaton said, and had already installed operations performing the same applications so "we could see what could be done" with the system.

Dietzgen manufactures products ranging from slide rules to microfilm cameras and has 3,500 items in stock.

The central systems communicate in real time with the six remote locations; portions of the data sent to the CPUs are selected for further processing by the 360/30 system

Before the systems were installed almost two years ago, Dietzgen was primarily using NCR billing machines at the manufacturing/warehouse locations for the order entry and billing functions. These machines produced hard copies of the orders, which were then sent to Chicago and rekeypunched there to be entered into the central system.

There were errors introduced during the keypunching operation, and when the company eliminated the operation it saved the expense of three keypunchers. It also saved time by transmitting data by wire instead of mailing hard copies and having to input that material a second time, a spokesman noted.

As a result, the company has reduced its delay in closing sales from the middle of the month to about two days after month's end — an elimination of about 12 days delay in closing.

Total cost of the systems, including terminals and printers at the six remote locations, was approximately $200,000.

Hardware located at Chicago headquarters includes two CPUs, each with 64K memory and dual disk drives; two medium-speed printers; and three CRTs.

System/4 Bows; Handles Cards

(Continued from Page 47)

Predefined procedures can be on a disk menu, which lists all the system's applications programs like order entry, general ledger and inventory control together with their respective functions, Puchon explained.

The System/4's CPU incorporates two processors — an 8-bit parallel binary control processor and a microprogrammed Interpretive Macro Processor (IMP), Decision Data said.

The control processor uses an Intel Corp. 8080 microprocessor with an 8-bit accumulator, six 8-bit programmable work/index registers and an 8-bit external data path, Puchon explained. It can execute instructions in 2- to 9 msec; with a 16-bit address bus it can directly address up to 64K memory locations, the firm added.

The IMP also directly addresses up to 64K locations and incorporates an Intel 3000 series microprocessor to execute macro-level operations generated by the system's RPG-II compiler and other software facilities, Decision Data added.

Besides the two microprocessors in the CPU, a minimum System/4 configuration incorporates one microprocessor in the workstation controller, one microprocessor in the workstation itself and a fifth device in the diskette controller, Puchon said.

The configuration's system bus can transfer information in and out of main memory at up to 1M byte/sec and can operate at up to 400 byte/sec with little control processor slowdown, Decision Data said.

The bus interfaces to peripheral controllers through a direct memory access (DMA) facility which consists of a disk controller, Microcoded Communications Line Adapter (MCLA) and a shared DMA controller (SDMAC) the company added. The MCLA is used when two System/4s are linked by communications lines or when one system communicates to a host mainframe, Puchon said.

Because it emulates IBM 2780 and 3780 as well as Univac DCT 2000 protocols, the system communicates with IBM 360s and 370s and with most Univac computers, the System/4 director added.

The SDMAC, meanwhile, interfaces low- and medium-speed peripherals like workstations and printers to the system bus, according to the company.

Puchon credited the DMA with needing only a 2- to 3-byte buffer to prevent bus underruns or overruns.

A minimum System/4 configuration with a 48K-byte main memory costs $22,400 from the firm at 100 Witmer Road, Horsham, Pa. 19044.

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Minis Fill Dutch Wholesaler's Real-Time Needs

AMSTERDAM, The Netherlands — Self-service wholesale organizations have two major requirements that lend themselves to using minicomputers: one is to provide their customers with completed invoices at the check-out counters; the other is to keep an accurate daily inventory of all stocked products.

Makro, the Dutch international self-service wholesaler, chose minis for its 27 outlets in The Netherlands, the UK, Belgium, Spain, South Africa and South America.

Since the early 1970s a DP and transmission system based on Hewlett-Packard 2100 minicomputers, linked off-line to IBM central processors in each country of operation, has helped the company keep track of changing prices and other business parameters.

"The investment in the computing systems has undoubtedly been a major factor in helping the company grow to its present position," one manager said.

The firm is now investing an additional $6 million in its DP system by replacing the 21 minis located in four countries with more powerful HP 3000 Series II business systems.

This latest change will bring about a further requirement for less maintenance and the capability to connect a larger number of invoicing terminals, according to the spokesman.

In addition, the systems will allow continued operation on all terminals in case of system breakdown.

The firm selected the equipment because it fulfilled several performance requirements including speed, easy access to management data and protection in case of system failure.

Real-Time Invoicing

Invoices had to be completed in real time at up to 38 point-of-sale terminals while customers were still at the check-out counters. Speed, therefore, was a prerequisite since a slower system causes queues to build up.

Individual stores also needed management information for use by store managers, and certain management data had to be transmitted from each store to one of the firm's national centers for further processing.

The system had to have some protection against failure of the computer hardware and it had to be capable of being used in all the company's outlets — so international standardization was required.

Every store has a "main" and a "backup" system, but each system is capable of handling all check-out terminals. In the event of a failure, invoicing can continue on the backup system with the use of a logging tape.

Each store will have two HP 3000 Series II computer systems, each with 192K bytes of memory, four 15M-byte HP 7905 disk drives, three HP 7970 magnetic tape drives and up to 38 point-of-sale terminals. The terminals include an invoice printer, a data-entry keyboard and a numeric display.

In operation, the check-out operator keys in the code number of the customer, then the computer retrieves the full name and address of the customer from the file and prints it on the invoice. The code of each article bought is also keyed in and the computer provides a detailed invoice.

Along with the handling of all check-out terminals, the systems concurrently perform several other functions. One is to track outstanding orders, goods received, price changes and other information, enabling Makro management to base its financial and management decisions on complete and recent data.

At the end of the day, this information is either processed locally on the 3000 or transmitted via telephone lines to a national data center where data is processed further on a mainframe computer.

This feature allows the staff at headquarters in the respective countries to watch local buying trends, enabling them to keep pace with demands.

"The most significant feature of the system is perhaps its ability to provide in the evening needed information to assess profits on the same day's trading," one manager said.

Each store's system includes a console from which management can access information held on the disk, including data on product-line trends.

The company is also exploring the possibility of using the systems for services not previously available, including sales-tax calculations and development of customer-screening procedures.

The firm's customer list includes merchants, small shopkeepers, hotels and catering establishments. Each store stocks about 35,000 products.

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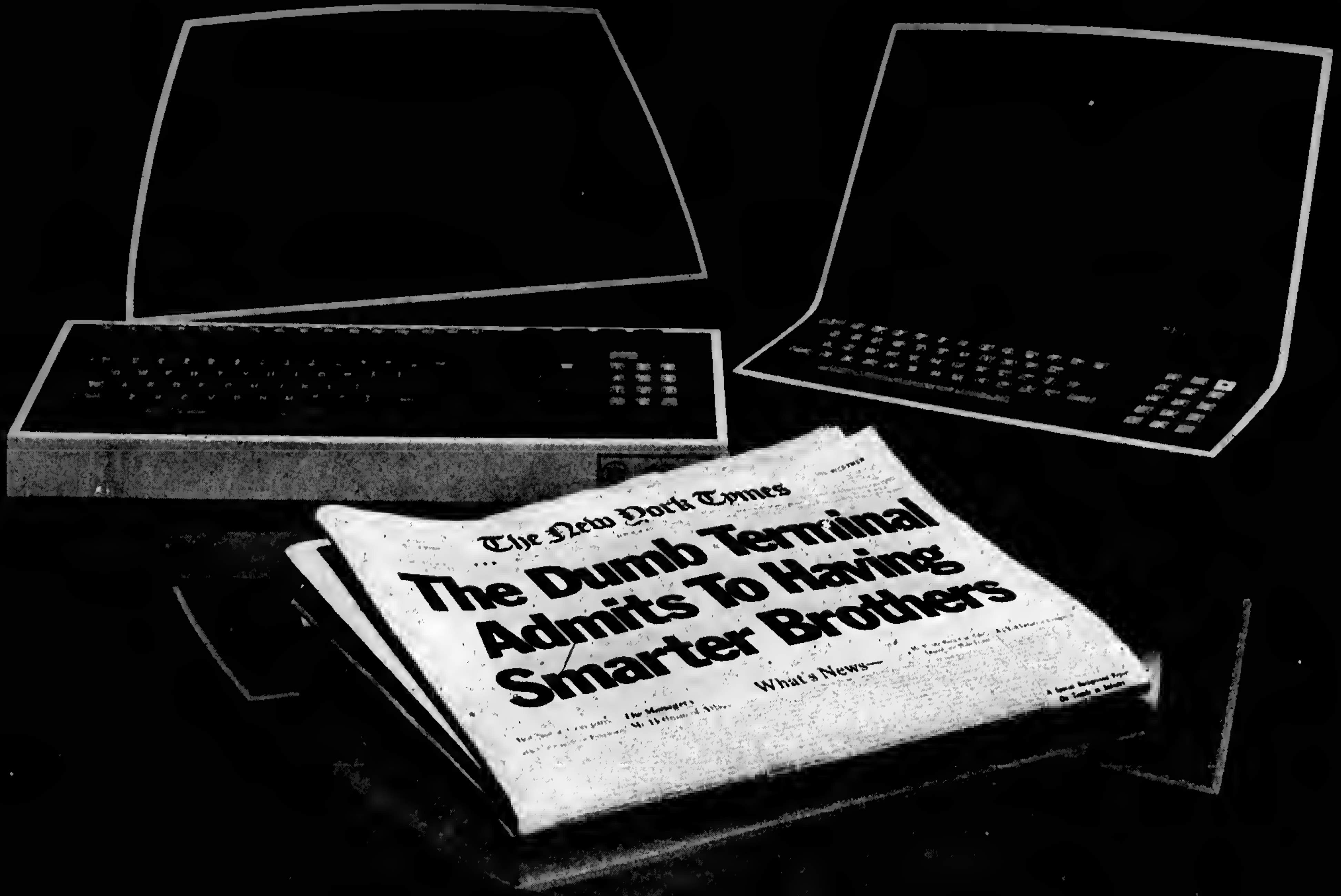
The New York Times
The Dumb Terminal Admits To Having Smarter Brothers
What's News—

Mini Users Seen Getting More for Less

By Esther Surden
CW Staff

NEW YORK — "Backwards" technology provides more capability more cheaply for users of minicomputer systems, Rowland H. Thomas, vice-president of Data General Corp., told a recent American Institute of Industrial Engineers conference here.

The technology is backwards, he said, in the sense that more capabilities usually go hand in hand with higher price tags.

Microprogramming, for example, is the basis of most current minicomputer architecture and gives manufacturers maximum design freedom to expand their early general-purpose instruction sets.

"These vendors are now adding machine instructions that were too complex and elaborate to implement with hard-wired logic. Microcoded instructions handle such things as vectoring, string manipulation and character operation in one CPU.cycle," he stated.

A few mini makers offer writable control store so that users can define and implement their own instruction set, he added.

There is also a trend toward greater and greater memory capacity and memory speeds are increasing to 800 nsec. "Newer memories are based on semiconductor technology because it's becoming faster and cheaper than core," Thomas said. Looming on the horizon for auxiliary memory storage are bubble memories, charge-coupled devices and rotating memory with thin film heads that can store 10 million bits per square inch, he noted.

Advances in peripherals are also providing more for less, he added, but software developments are perhaps the most important ones for users.

"In may cases, the breadth of minicomputer software is equivalent to that of mainframe systems," he asserted.

"The new generation of multiprogramming systems supports time-sharing, batch and real-time operations concurrently," he pointed out.

"The list of business-oriented languages available is now as long as that of standard scientific languages."

"Sophisticated optimizing techniques are coming along to make these languages more memory-efficient and execute faster," he added.

Finally, communications software is also coming of age, Thomas said.

Multiprocessors Urged for Large Loads

Continued from Page 47)

capability when he first installed the system. That way the system treats the unadded portion as "dead" until it is added.

If that capability has not been added, then reconfiguring may take several hours.

Tandem is not alone in offering users multiple configuration systems, Wiegand noted, but it is the only company that has designed a whole system around the concept. The system suits users across industry and applications boundaries, he noted. The only requirement is that the user be somewhat sophisticated and have an application in which on-line interactive system reliability and data integrity are important.

Typical users appear in the banking, credit, retailing, manufacturing, wholesale distribution, communications, medical and publishing businesses. Actually, any user with an application that has a throughput requirement of 10 or 20 transaction/sec can use the system.

It also can acommodate workloads up in the 50 transaction/sec range, Wiegand said. That is beyond the range of most minis, he noted, and even beyond the range of many mainframes.

File Technique

Fast throughput on the system is a result of a file usage technique in which a single file is spread among several processors; this balances out the reads and writes among the files, upgrading transaction processing performance significantly, he explained.

The programmer can access any file from any of the processors without having to "change a line of code," he added.

The Tandem system has several features that sets it apart from the rest of the small system field, Wiegand said. The data communications option and data base management system are implemented at the driver level, the lowest level of the operating system. Many other minis put these features on top of the system software, creating a lot of overhead and slowing the operating system down, he said.

Reliability is the system's primary user-oriented feature, Wiegand stated. If a component fails, the CPU console is notified about which part is down. The system continues to operate despite the failure because the remaining components automatically take over.

Interface Unit Fits DG Novas, Eclipses

WHEATON, Md. — The Ray Bushnell, Inc. Model 417 bidirectional interface module is a device that allows Data General Corp. users to interface with instrumentation devices.

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Micro Bytes

Digital Printers Feature Dot Matrix Print Head

CHATSWORTH, Calif. — Anadex Corp. has introduced the DP-1000 series of digital printers, featuring a dot matrix impact printing element capable of printing 64 alphanumeric and special symbols in 40 char./line at 1.25 line/sec.

Three basic Ascii configurations allow interfacing to most minicomputers, modems and the current-drive mode of Teletype Corp. printers. Single- or double-width characters may be selected via an external control line, allowing either 6 or 12 char./in. to be intermixed on a line.

Prices for the DP-1000 series start at under $700; Anadex said from 9825 DeSoto Ave., Chatsworth, Calif. 91311.

Word Processing System Runs Under Mits Basic

OWINGS MILLS, Md. — Interactive Data Systems here has developed a word processing system, Idsword1, designed to run under Mits Co. Disk Extended Basic.

Features of the system include line editing — for inserting, deleting or changing text in a line of data; global editing — for inserting, deleting, changing or finding strings of data in a selected block of text; reformatting — which moves words between lines for maximum line size; and merging — which combines portions of various files into a single file, a spokesman said.

In addition, text can be printed with optional page numbering and right justification. Multiple copies of form letters can be produced from name and address files, the spokesman added.

Idsword1 consists of several programs and, although transparent to the user, requires 28K of memory. The package costs $250 and includes documentation and the program diskette. Interactive Data Systems can be reached through P.O. Box 290, Owings Mills, Md. 21117.

Data Base Program Offered

BLACKSBURG, Va. — A data base program that can be used with microcomputers that use the Basic language has been announced here by Physical Biological Sciences, Ltd.

Outlined in a book called *People's Data Base System,"* this program can be understood by nonprogrammers since it requires only familiarity with command calls, according to a spokesman.

The volume is available for $14.95 from Physical Biological Sciences, Ltd., Box 47, Blacksburg; Va. 24060.

PCM-12 Gets Dual Floppy Disk Interface Module

SAN RAMON, Calif. — Pacific Cyber/-Metrix, Inc. (PC/M) now offers a dual floppy-disk interface module for its 12-bit microcomputer, the PCM-12.

PC/M's 12440 module will reportedly allow PCM-12 users to execute all Digital Equipment Corp. PDP-8 diagnostics when used to interface the PCM-12 to Data Systems Design's Model 210 floppy-disk memory system. This device also makes the PCM-12 system fully compatible with mass storage operating systems already developed for the PDP-8 family of minicomputers, a spokesman added.

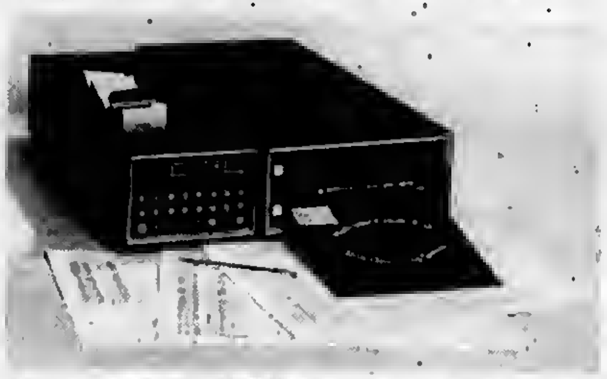
The unit sells for $259 assembled and $169 in kit form from Pacific Cyber/Metrix, Inc., 3120 Crow Canyon Road, San Ramon, Calif. 94583.

For 8080, 8085

System Supports BSAL

SUNNYVALE, Calif. — A multiuser/-multitask development system for use with the 8080 and 8085 microprocessors was unveiled by Mupro, Inc.

The system, composed of the Mupro-80 microcomputer and 80D dual floppy diskette drive, features the Mute software package. This package supports Block Structured Assembly Languages (BSAL) as well as mnemonic assemblers. BSAL has a high-level syntax, intuitive statement formats, self documentation and cross-reference tables, according to the firm. The 80D diskette system is IBM 3740-compatible and controlled by a card.



Mupro's 8080/8085 software development system costs $9,000.

The disk controller accommodates up to two dual-disk drive units, contains a programmable real-time clock, and supports disk data transfers via direct memory access, a spokesman said. The floppy disk drive is voice-coil actuated with an average seek time of reportedly less than 50 msec.

This system package also accommodates options such as real-time in-circuit emulation and on-line programmable read-only memory (Prom) to satisfy the hardware/-software design, production and field service requirements, the company said.

The Mupro-80 microcomputer and Mupro-80D dual floppy diskette system with Mute and all related software, is priced at $9,000 from Murpo, Inc., 424 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Development Lab Debuts

BEAVERTON, Ore. — A development lab that provides in-prototype emulation for 8- and 16-bit microprocessors has been introduced by Tektronix, Inc.

The 8001 is designed for the developer of microprocessor-based systems who already has access to software development capabilities, but requires a test bed for hardware checkout and integration of software and hardware, the firm said.

Programs developed on external standalone or time-shared systems can reportedly be downloaded to the 8001 via an RS-232C source. Then, the user's program can be run in emulation mode. A control probe is then connected between the 8001 and the prototype.

When a transfer of memory blocks begins, only good segments are turned over to the prototype with troublesome segments held back until the bugs are worked out.

The price of the 8001, which includes an emulation processor and prototype control cable, is $7,650 from Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97077.

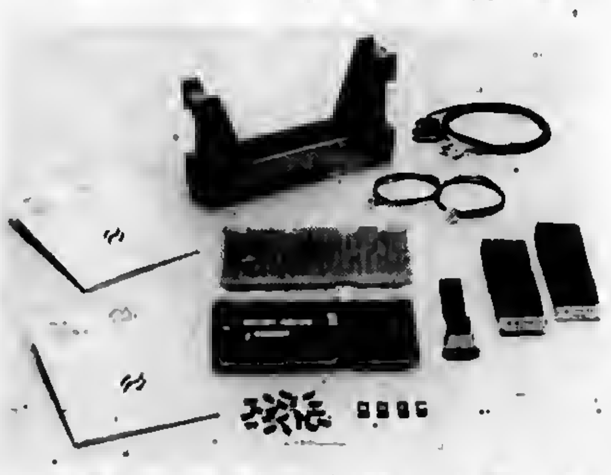
Tektronix Development Lab

Prototyping Package Unveiled

SANTA CLARA, Calif. — A prototyping package that lets designers construct and debug custom interface systems was introduced by the National Semiconductor Corp.

The BLC 80P package consists of an 80/10 computer board with 1K words of random-access memory (RAM) and 2K words of blank programmable read-only memory (Prom). It has 48 programmable parallel I/O lines that are socketed to accommodate interchangeable line drivers and terminators, the firm said. The package includes 10 DM 7437 open-collector line drivers, 10 BLC 902 1K-ohm terminating resistor networks, and 10 BLC 220/330-ohm terminating resistor networks.

To aid in developing customer interface circuits. BLC 80P contains a prototype board with space for 114 16-pin sockets.



National Semi has packaged the BLC 80P prototyping package.

The 6.25-in. by 12-in. MPU and prototype boards are housed in the BLC 604 card cage which reportedly accommodates two additional Series/80 boards. The BLC 80/10 has jumper-selected options for RS-232 or current-loop mode and cables are supplied for a CRT terminal and teletypewriter.

The BLC package, including hardware reference manual, users guide, and schematics costs $878 from the National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

I/O Expansion Card Bows

SANTA CLARA, Calif. — An I/O expansion card, added to the Series/80 Board Level computer series, has been introduced here by the National Semiconductor Corp.

The board, which can transfer data at rates up to 1.3M-byte/part, connects to the system bus through the 86 pin card edge and has a 100 pin edge connector for parallel I/-O, said the firm. Data, address and control signals are transistor-transistor logic (TTL) compatible and it operates on +5vDC, according to a spokesman. The four output ports have a variable width strobe available for peripherals, which is set in a range from 100 to 1,600 nsec by a plug jumper.

The board, which can accept eight external interrupt requests, sells for $315 from National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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System Tests Applications

HIRAM, Ohio — A system designed for use in the development of programs to run on microcomputer systems and as a prototype for microcomputer applications has been introduced here by Ohio Scientific.

The Challenger III is equipped with three microprocessors and a triple-processor micro processing unit (MPU) board, making it ideal for education, small business and personal computing, the firm said.

Options include additional memory, line printers, CRT terminals, 1M-byte memory management, software processor switch, configuration for up to 16 users, video board and video programmable read-only memory and an additional parallel port.

With 32K of random-access memory, a serial interface, a dual drive floppy disk and software, Challenger III costs $3,481 from Ohio Scientific, 11681 Hayden St., Hiram, Ohio 44234.

Datel Has Tabletop Printer

CANTON, Mass. — A tabletop printer for microcomputer systems has been introduced by. Datel Systems, Inc.

The AIP-40 can print up to 40 columns on ordinary adding machine roll paper using a 5 by 7 dot matrix impact printer, said the firm.

Up to 64 Ascii-coded letters, numbers and special characters are accepted and printed at a rate of 50 char./sec, according to a spokesman.

Among the features offered as selectable modes are double-width characters for bold printing, parity detection, 10- or 11-bit teletypewriter characters, reverse field printing and automatic printing start for serial models if no data is received after 3 sec, he said.

The automatically reversing ink ribbon will reportedly print 100,000 lines. A 170-ft paper roll contains about 12,000 lines.

The AIP-40 including the housing, print mechanism, choice of power supply and interface electronics costs $425 from Datel at 1020 Turnpike St., Canton, Mass. 02021.

Adapter Available

BROOKFIELD, Conn. — The Connecticut Microcomputer Corp. has introduced an adapter which reportedly makes it possible for a micro's teletypewriter port to be used to drive an RS-232 terminal, or vice versa, without modification of the port, according to the firm.

The adapter has two circuits, one to convert an RS-232 signal to a 20ma current-loop signal and a second to convert a 20ma current-loop signal to an RS-232 signal.

The adapter sells for $24.50 with drilled, plated-through solder pads for all connections or for $29.50 with barrier strips and screw terminals from the firm on Pocono Road, Brookfield, Conn. 06804.

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A

assembly language — Most microprocessor programs are written as a series of source statements using mnemonic symbols that assist in the definition of the instruction and are then translated into machine understandable object code, e.g. binary 0s and 1s.

asynchronous transmission — Refers to transmission in which each group of code elements corresponding to a character signal is preceded by a start signal which serves to prepare the receiving mechanism for the reception and registration of a character and is followed by a stop signal which serves to bring the receiving mechanism to rest.

auxiliary storage — A storage device in addition to the main storage of a computer, e.g., magnetic tape, disk or magnetic drum. Auxiliary storage usually holds much larger amounts of information than the main storage, and the information is accessible less rapidly.

B

background processing — The automatic execution of lower priority computer programs when higher priority programs are not using the system resources.

backplane, microcomputer — A typical bus-oriented backplane is used as the data highway between logic memory and process input/output modules. Some backplanes are configured so as to give each module plugged into it its own unique address. As a result of this "card address" design, users can interchange memory and input/output modules throughout the chassis. One type backplane has in each chassis three control slots, one terminator slot and 16 multipurpose addressable slots. Since only three of the 16 are used in many basic systems, 13 slots are available for users to plug in any additional memory or interfacing required.

B address — The higher order position of the instruction code indicating the location of data to be processed.

balanced (to ground) — The state of impedance on a two-wire line when the impedance to ground as measured from one side of the line is equal to the impedance to ground as measured from the other side of the line.

Basic — Beginner's All-purpose Instruction Code. A common high-level time-sharing computer programming language. It is easily learned and used for direct communication between teletypewriter units and remotely located computer centers. The language is similar to Fortran II and was developed by Dartmouth College for a General Electric 225 computer system.

LEARNER'S LEXICON

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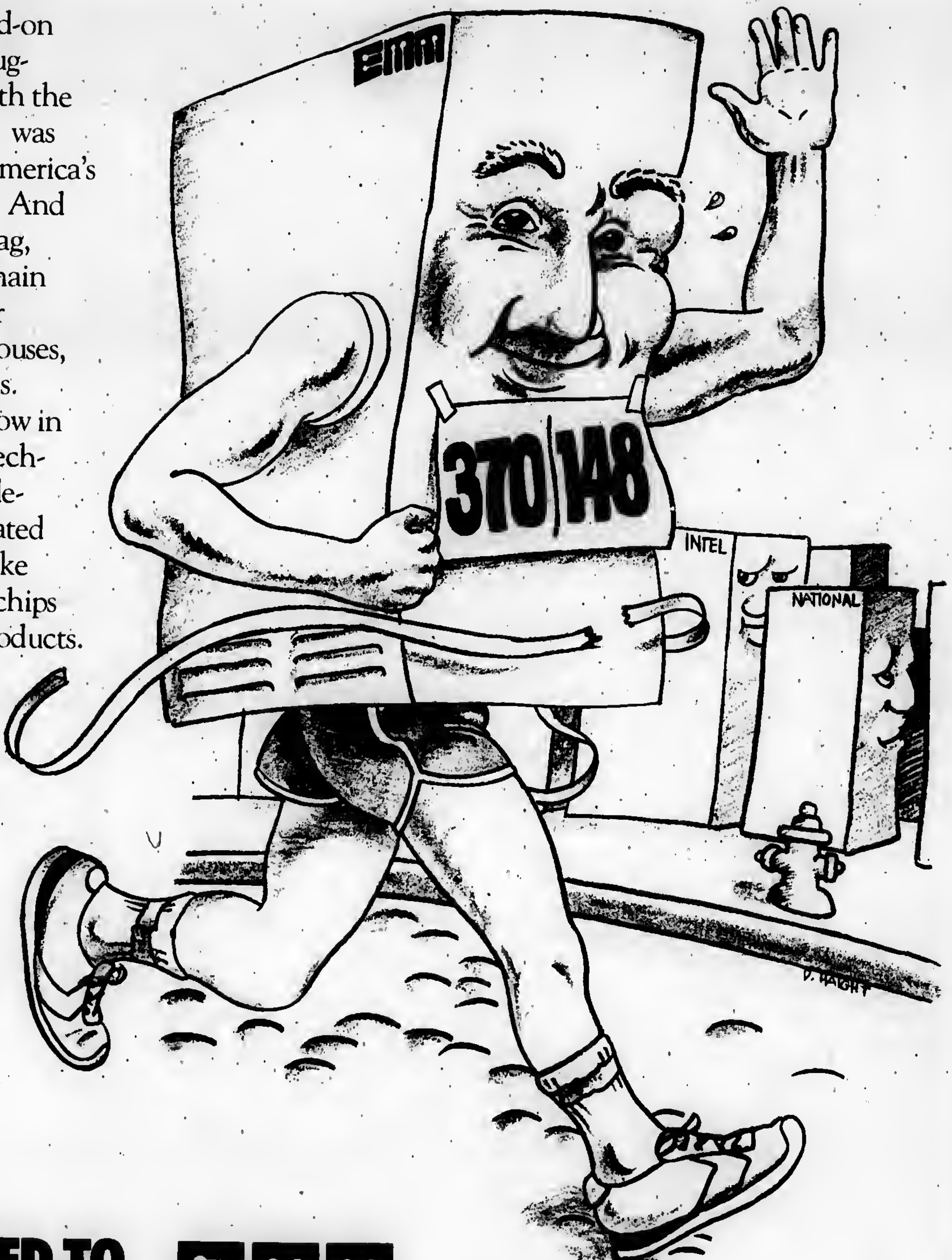

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Despite Strong Industry Growth

Charts Show IBM Outran Others in '60s

By Catherine Arnst
CW Staff

NEW YORK — Although the computer industry experienced a high growth rate of 25% during the 1960s, no firm ever came close to matching the size of IBM's installed base, according to Dr. Alan K. McAdams, the government's chief economic advisor for the U.S. vs. IBM antitrust case.

According to charts developed by McAdams and entered into evidence at the trial, IBM's share of the domestic installed base always hovered around the 70% line while the other firms studied were generally below 10%.

This trend is consistent in all of McAdams charts, although he used data from three different sources: IBM Competitive Statistics (Comstat) figures, which IBM gathered by having its salesmen contact users; International Data Corp. (IDC) statistics, which the market research firm gathered by contacting users directly; and government estimates based on a survey of manufacturers the Justice Department conducted for this case.

McAdams used Comstat computer system categories for all his charts, no matter what the source of data. These categories broke down systems by size, with categoreis A and B representing large scientific computers, G representing small business computer systems and C through F representing general-purpose systems, a market which IBM is alleged to monopolize.

When the installed base share of IBM and its competitors (Burroughs, Control Data Corp., Digital Equipment Corp., General Electric, Honeywell, NCR, RCA, Singer, Univac, Xerox and others) were derived for all the Comstat categories, IBM garnered 71.4%, Honeywell and Univac held 8.1% and 9.6% respectively and the rest of the firms ranged from 4.5% to .1% in 1972.

IDC, U.S. Figures Lower

IDC figures for the same categories showed IBM with 69.2% in 1972 while the other firms ranged from 9.1% to .5%. Government estimates gave IBM 69.5% with the other firms ranging from 10.5% to .1%.

Both IDC and Comstat figures included each firm's internally installed systems, whereas government estimates did not, resulting in government estimates that tended to understate market share, McAdams said.

In a companion set of charts, McAdams extracted the scientific and small business system categories from his calculations to demonstrate IBM's market share of the general-purpose installed base is higher than the overall installed base. The market shares of the other firms depicted in the charts either dropped or, in the case of Burroughs, rose only one percentage point in 1972.

IBM's share of the general-purpose market, according to McAdams' charts, has been greater than its share of the overall computer market since 1964, which is approximately the time it announced its 360 line of systems. The government has claimed that several of the 360 machines were anticompetitive, and McAdams used these charts to demonstrate what he believes is IBM's dominance over the general-purpose computer market.

The general-purpose market has experienced extremely rapid growth during the 1960s, McAdams said, and IBM has kept pace with that growth. When the value of installed base is measured in millions of dollars per month in rental IBM increased in size from $25,540,000 in 1960 to $330,923,000 in 1972, according to McAdams' calculations.

All the other firms measured also experienced this rapid rate of growth of 25% to 28%, he said. However, as with the percentage of installed base, no other firms came even close to IBM's earned rentals; Univac, the second largest on McAdams' charts, started out with $3,303,000 in 1960 and reached $49,879,000 by 1972.

These other firms rarely even came close to IBM's 1960 installed base throughout the 12-year period measured, according to the charts. CDC's installed base in 1972 equalled 60% of what IBM had in 1960, and Univac did not meet IBM's 1960 level until 1968. It was not until 1972 that Univac met the industry giant's 1961 level.

This rapid growth rate took place even for firms showing losses and placed an unnaturally high pressure on managers, McAdams said. When combined with the leasing environment in which the computer industry operates, which requires a firm to absorb losses for a long period before it is in the black, the growth rate required an unusual degree of talent and ability from managers, which constituted a barrier to entry, McAdams said.

Without IBM Net, DP Industry In the Red During 12 Years

NEW YORK — The proof that IBM does have monopoly power is that it sustained high and increasing profits over a long period of time, which would in an open market foster competition and new entrants, government witness Alan K. McAdams testified in the U.S. vs. IBM trial.

In fact, IBM's profits were so great from 1960 to 1972 that its results were solely responsible for the industry showing overall profitability, according to figures from McAdams. Excluding IBM's results, the industry showed a pretax loss each year.

The government's Exhibit 5112 details the pretax profits and losses from operations of 11 firms and shows that only four in addition to IBM had aggregate earnings in 1972 for the preceding 12-year period. These were Control Data Corp. ($98.2 million), Digital Equipment Corp. ($93.6 million), Honeywell Corp. (nearly $51 million) and Singer Corp. ($1.2 million in 1972; Singer reported results only for that year.)

NCR showed the largest aggregate loss — $453.75 million — for the 12 years, followed by RCA, $346.1 million; General Electric Co., $254.1 million; Univac $90.3 million; and Burroughs, $25.8 million.

In 1960, the industry except IBM lost $71.9 million, but the total with IBM showed a $218.96 million profit.

In 1965, without IBM, the industry lost $102 million compared with earnings of $486.4 million when IBM's share was added.

The industry without IBM showed a profit in one year, 1969, when it earned $41.8 million. After IBM's results, the industry showed a tidy $1.11 billion.

Hard Times

But in 1970, when hard times hit, the results were vastly different. The industry without IBM lost $92.2 million compared with earnings of $802.4 million including IBM's profits.

In 1971, excluding GE's and IBM's figures, the industry showed a loss of $140.7 million compared with earnings of $705.9 million when including IBM's results.

In 1972, RCA and GE did not report their results, having both exited from the business. The others sustained a combined loss of $49.9 million while profits with IBM were $923.4 million, according to McAdams.

Looking at the progress of various firms, one can see different styles of operation in effect. CDC operated in the black for 10 years until 1970 and 1971, then climbed back in the black in 1972. Univac, by contrast, incurred loses of over $15 million each year between 1960 and 1965 and then was in the black until 1971.

Mini maker Digital Equipment Corp., in a business which is primarily sales and not leases, never dipped into the red.

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Net Announcement Marks HP Policy Change

By Esther Surden
CW Staff

CUPERTINO, Calif. — With the announcement of the beginnings of a network architecture based on the CCITT X.25 standard [CW, Oct. 31], the Hewlett-Packard Co. here departed from its well-touted policy of announcing products only after they are ready for delivery.

The reason for the change was to give the company's users some idea of the developments they can expect in the future in this area from the firm and to let them know HP is devoted to producing products that will conform to the standard, according to James E. Candlin, development section manager for data communications networks and systems.

Several of the products that will allow this network concept to work have already been announced, including DS/3000 last May and DS/1000, which was introduced in 1963 and enhanced in 1975 and 1977.

This announcement "puts the cement in between the business and technical product lines," Candlin said. "Networks take a long time to build; and it is important for the management of the companies we deal with to know what direction HP will be taking in the future."

The recent announcement brought the company closer to providing a total communications solution, he claimed. When all the products are in place, HP will be supplying "what amounts to a turnkey network."

'Layered Approach'

The HP Distributed Systems Network consists of several functional layers in software, with only very high-level services visible to applications programmers and users, Candlin said. In most cases the user does not have to treat communications differently from other activities.

In addition, HP is using what is calls a "layered approach." The company can change the layers without making the user change his software investment. All protocol changes or other enhancements would be made transparent to the users.

"Communications is a complex business," Candlin stated. "We can hide much of it from the users."

Several factors contributed to HP's decision to make the announcement at this time, he noted. For example, a lot of progress had been made in the industry in determining an appropriate standard; HP waited until the standard had been developed.

In addition, the multilocation companies to which HP markets are very cautious about committing themselves to a vendor, and HP wanted them to be aware of its intentions.

It also waited until it could provide a solution, rather than a few tools to help sell its system, he noted.

Competition has led to a lot of progress in the mini area, Candlin said, and communications is going to become a very competitive issue as firms compete for their share of the distributed processing market.

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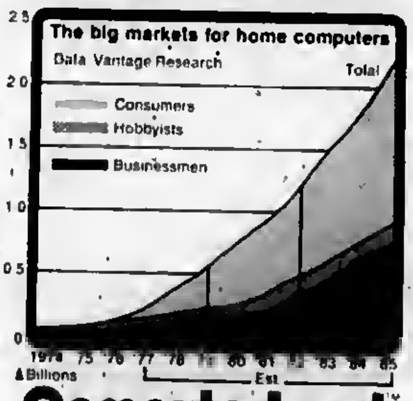

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Orders & Installations

Rensselaer Polytechnic Institute of Troy, N.Y., has purchased a Prime 500 computer system valued at $750,000 for interactive graphics applications and software development.

Frontier Airlines Credit Union has installed the Docutel Corp. Financial System 2000 in its Denver offices.

Blue Cross of Massachusetts has ordered Incoterm Corp. intelligent terminals, related hardware and services valued at approximately $700,000.

The Environmental Protection Agency has ordered a copy of United Computing Systems' Inform-11 data management systme for installation on its Digital Equipment Corp. PDP-11/70 in Cincinnati, Ohio.

Hyde Athletic Industries, Inc. of Cambridge, Mass. has ordered a Honeywell Level 62 computer system valued at $144,000 for on-line inventory control and order processing as well as for standard financial management applications.

Bechtel Power Corp. of Gaithersburg, Md., on behalf of the Standard Nuclear Unit Power Plant System group (Snupps), has ordered five nuclear power plant monitoring systems from Honeywell's Process Control Division.

Maryland Casualty Co., has ordered 29 DXS Data Exchange Systems valued at $1 million from Texas Instruments, Inc.

The Houston Area Teachers Credit Union has begun installation of Docutel Corp.'s Financial System 2000 at its main office.

The Retail Store Employees Union of St. Louis, Mo., has ordered a Honeywell Level 62 computer system to replace its current Honeywell Model 2020. The system is valued at $171,000.

Lowry Enterprises has ordered a Univac 90/30 system for installation in its St. Louis, Mo., headquarters.

Steak 'n Shake, Inc., Indianapolis, has ordered up to 200 Model 3220 Documentor point-of-sale management systems valued in excess of $1.5 million from Addressograph-Multigraph Corp.

E.F. Johnson of Waseca, Minn., Dayton Walther Corp. of Dayton, Ohio, and the Fabri-tek Corp. of Edina, Minn., have installed Comserv Corp.'s CAS-III financial reporting software system.

The Commonwealth of Puerto Rico Highway Authority has ordered a Honeywell Model 68/80 Multics system valued at $5 million.

Hurd Associates, a Fremont, Calif., software firm, has ordered 20 Honeywell Level 6 minicomputers.

Fireman's Fund of San Rafael, Calif., has ordered a Stor/168 add-on memory system from Cambridge Memories, Inc.

The *Paterson* **(N.J.)** *Morning and Evening News* **has ordered a Tal-Star Computer System, Inc. T-410S publishing system for its news, display and classifed text processing.**

Midwest Electric, Inc. of St. Mary's Ohio, has ordered a Honeywell Level 62 computer system valued at $135,000.

The Evanston, Ill., Public Library installed a Libs 100 Circulation Control System.

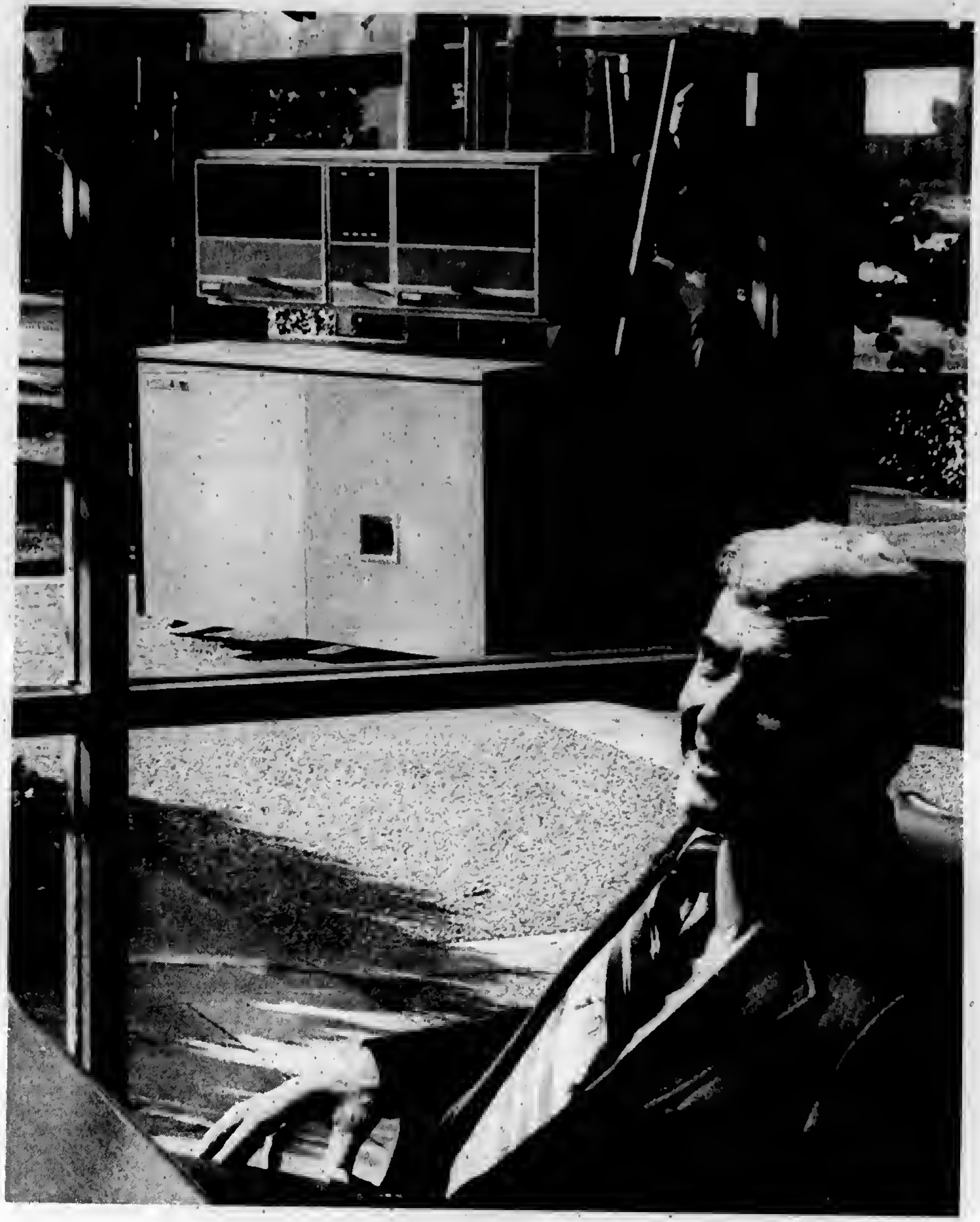
Illinois Auto Electric, an automotive parts warehouse distributor, has ordered a Honeywell Level 64 system valued at $550,000.

Republican and American **of Waterbury, Conn. has ordered a Decedit computerized copy and editing system valued at $260,000 from Digital Equipment Corp.'s Graphic Arts Group.**

Howard Community College in Columbia, Md., has ordered the Necol conversion package from Computer Facilities Software Ltd., of Cleckheaton, England.

O.Z./Gedney Co. of Terryville, Conn., has ordered 20 Cado System 40 computers from Desco Data Systems.

The Catawba Memorial Hospital of Hickory, N.C., has ordered a Honeywell Level 62 computer system to perform its accounting functions. The Level 62 system is valued at $217,000.



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'Natural Outgrowth'

Key Tronic Taking on OCR, End-User Markets

By Esther Surden
CW Staff

SPOKANE, Wash. — Key Tronic Corp. here is making the transition from being a one-product firm that serves data entry terminal makers with customized keyboards to being a two-product company that serves both end users and manufacturers.

The product responsible for the transition is a line of OCR equipment that Lewis Zirkle, founder of the company, said is a natural outgrowth of the firm's initial product. The privately held company was founded in 1969 with electronic keyboards its only product.

Although there were other keyboard makers in the field already, Zirkle saw a need for a supplier of keyboards that would "give complete service" to independent producers of data entry equipment, he reported.

"About three years ago, we recognized we were becoming a leader in keyboards," he stated. The firm also recognized that it was a one-product firm and needed to diversify, Zirkle added.

The turn toward OCR came very naturally for the company since it was already in the data entry field, he noted. When considering which way to diversify, the company really only contemplated staying in data entry. Since it was already making tactile data entry devices, the only other options open to it were voice data entry or camera data entry, he said. It chose the camera technique.

Unique Niche

Zirkle feels his company has a product that occupies a unique niche in the marketplace. Most OCR systems require that a user trade in his present computer for a system that processes using OCR for data entry. "We haven't tried to change anybody's system. We recognized that data entry was the most expensive part of DP" and tried to make that more efficient.

The company's desktop units and hand-held wands are used as additions to the user's system, he noted.

Both parts of Key Tronic's business are growing. "Last year the keyboard operation expanded 45% over the year before" and that part of the business has been growing steadily since it began, the president said.

Zirkle predicted that the 45% growth rate will be maintained this year. The OCR operation is in what he called the "initial order stage" with customers ordering trial units before committing themselves to large orders.

The controversy over whether or not OCR will proliferate or die not withstanding, Zirkle predicted that within two or three years OCR could be a major or the predominant portion of the company's business.

"There must be some improvement in its implementation," he admitted, but technology is continuing to improve the equipment. In the future, OCR equipment will probably have microprocessors used in it, making the systems not only more economical to purchase but also cheaper to use, he added.

Although seemingly very different, the two aspects of Key Tronic's business are really similar, he continued. Both involve customization. Each manufacturer wants a particular feature to be on its keyboard in the same way that an end user wants the OCR system customized to his operation, he said.

Market Challenge

The OCR side of the business represents a marketing challenge to the officers of Key Tronic. That challenge is being met through the use of two marketing approaches.

First, the company has identified particular market segments with applications that can benefit from using OCR in addition to their present way of handling business. Secondly, it has begun setting up independent "agents" in 10 major cities to exclusively sell the company's OCR line.

Since the firm prides itself on offering users service with the product, it will handle all service and support directly. Later, this situation could change and support could be shifted to the agents after they become established, according to Fred Zirkle, president of the OCR division.

Major marketing areas for the OCR equipment include remittance processing, bank card processing, check processing and airline ticket processing, he said. "Our approach differs [from other vendors'] in that we don't sell a complete system," Fred Zirkle said.

"We are the only OCR company I know of that offers users the capability to upgrade their own systems with OCR," he said. The systems his firm sells allow the user to process with proven hardware and software, he continued. When Key Tronic looked into establishing its OCR business, it wondered why the technique had not been successful in the past, he said.

One of the reasons was the price of the equipment. It was difficult to find equipment for less than $50,000 and the average system cost about $150,000, he noted.

"The biggest problem we saw was that in order to buy OCR capability, users had to buy from an unproven company trying to prove itself in OCR" as well as in system software and hardware.

Within the company's OCR equipment, the OCR transport is outpacing the wand mechanism in sales.

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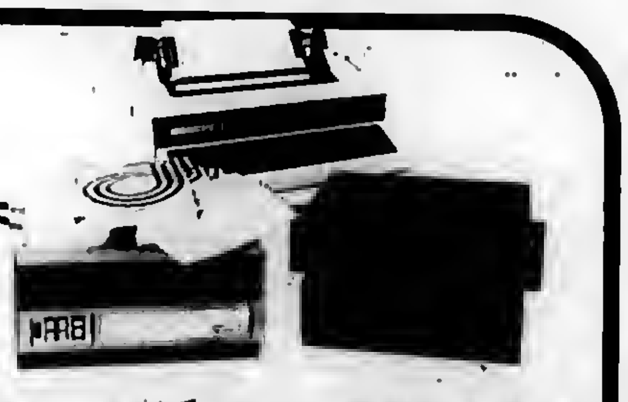

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Financial News

DP Gains Help Honeywell Show Quarter Revenue Rise

MINNEAPOLIS — Honeywell, Inc.'s revenues and operating earnings rose for the third quarter and nine months compared with the year-ago figures.

Worldwide computer rental and service revenues rose 15.5% in the quarter, contributing to the corporate total of $711.6 million compared with $638.5 million in the third quarter last year.

Operating earnings for the quarter grew to $36 million compared with $24.9 million in the year-ago period, when there was also a $12 million capital gain from the sale of shares in Honeywell-Bull. The gain raised 1976 net income to nearly $37 million.

Per-share income was $1.70 this quarter compared with $1.80 in the same period last year.

Purchase revenues from computers also were higher for both the third quarter and nine months. Net computer bookings worldwide were higher for the nine months, and third-quarter bookings exceeded those of the same period in 1976, the firm said. Bookings were especially strong in Europe.

Computer operating margins continued to improve, the company said.

During the nine months, revenues and earnings exceeded those of the year-ago period, which included the $12 million credit.

Earnings rose to $96.5 million or $4.58 a share compared with $69.9 million or $3.21 a share in the year-ago period, while revenues approached $2.1 billion compared with $1.78 billion in the nine months of 1976.

CII-Honeywell Bull "is performing somewhat in excess of expectations for 1977, and we are realizing the benefits expected from the merger," according to Edson W. Spencer, president and chief executive officer.

"The French government continues its support of the new company, and Honeywell is benefiting from strong research and development capabilities in France," he added.

STC Sets Record In Third Quarter

LOUISVILLE, Colo. — Storage Technology Corp. (STC) chalked up a record third quarter with earnings up 56% and revenues 45% over the comparable period last year.

Earnings totaled $3.1 million or 57 cents a share compared with nearly $2 million or 40 cents a share in the same quarter last year.

Revenues reached $40.8 million compared with $28.2 million in the 1976 period. Rental and service income accounted for $14.6 million and $10.8 million respectively.

For the nine months, STC's earnings grew to $7.5 million or $1.44 a share compared with $5.3 million or $1.08 a share in last year's perod. Revenues reached $70.5 million compared with $56.9 million in the year-ago nine months.

All per-share amounts were adjusted for the 6% stock dividend declared in the first quarter of 1977.

Univac Boost Aids Sperry

NEW YORK — Sperry Rand Corp.'s second-quarter earnings rose 6.3% and revenue gained 8.8% over the comparable period last year, boosted by a 12% rise in revenues from Univac computers.

During the quarter ended Sept. 30, the firm earned $39.9 million or $1.05 a share compared with $37.5 million or 98 cents a share in the same quarter last year.

Revenues reached $844.3 million compared with $776.2 million in the last year's quarter.

Computer orders were up 13% and backlog rose 25%, the firm said.

J. Paul Lyet, chairman, said the firm expects the momentum in new orders for computers to continue as a result "of further new product introductions and the continued buildup in our marketing organization."

For the six months, Sperry Rands' earnings rose to $77.4 million or $2.03 a share compared with $72.3 million or $1.90 a share in the same period last year.

Results for the quarter and the six months reflect increased revenue and income from the computer, fluid power and guidance and control businesses, Lyet said.

Backlog for the coroporation at the end of September was $2.16 billion, up 17% over a year ago.

Profits of New Holland farm equipment division were down from a year ago on slight increase in revenue.

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Edited by Ron Frank, *Data Communications Networks* will examine the often confusing array of protocols, architectures, equipment and transmission methods available. And, it will help you understand the guidelines to use for configuring or expanding your network, with tutorials and applications stories on how effective networks are designed and maintained. Here's a sampling of the kinds of stories you'll see.

- Selecting the right terminal for the right job in the right network.
- Case histories of successful networks and how they were designed and configured
- An evaluation of IBM's Systems Network Architecture
- The tradeoffs between private line networks and packet networks

If you're involved with data communications, or if you expect to be in the not too distant future, our November 28th special report will help you have what you need to know. And if you market data communications equipment or services, our report is where you should advertise. Ad closing date is November 11. For details, contact your *Computerworld* salesman. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

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Earnings Reports

CALIFORNIA COMPUTER
Year Ended June 30

	1977	a1978
Revenue	$118,224,000	$121,891,000
Loss	1,992,000	4,149,000

a-Restated

COMPUTER COMMUNICATIONS
Year Ended June 30

	1977	1979
Shr Ernd	$.81	$.40
Revenue	13,522,390	9,238,294
Tax Cred	023,000	580,000
Earnings	1,813,993	1,104,473
3 Mo Shr	.19	.19
Revenue	3,819,919	2,990,539
Tax Cred	283,000	230,000
Earnings	478,917	494,424

CONTROL DATA
Three Months Ended June 30

	1977	1978
Shr Ernd	$.95	$.97
Revenue	390,797,000	335,135,000
Earnings	14,597,000	11,507,000
9 Mo Shr	1.52	1.25
Revenue	709,029,000	641,999,000
Earnings	28,294,000	21,987,000

CPT
Year Ended June 30

	1977	1978
Shr Ernd	$1.02	$.93
Revenue	13,025,468	10,941,194
Earnings	1,303,271	073,046
3 Mo Shr	.41	.26
Revenue	4,640,339	314,449
Earnings	539,072	314,449

CRAY RESEARCH
Three Months Ended June 30

	1977	1979
Shr Loss	$.48	$.21
Revenue	527,327	.....
Loss	934,206	289,019
8 Mo Shr Loss	.90	.53
Revenue	1,036,301	.....
Loss	1,121,776	579,949

TELEFILE
Three Months Ended June 30

	1077	1979
Shr Ernd	$.35	$.43
Revenue	3,505,293	2,170,399
Earnings	470,298	830,831
9 Mo Shr	.29	.27
Revenue	6,718,477	3,644,901
Earnings	390,071	332,050

TRANSNET
Year Ended June 30

	1977	1979
Shr Ernd	$.27	$(.07)
Revenue	3,574,128	974,519
Earnings	569,229	(99,929)

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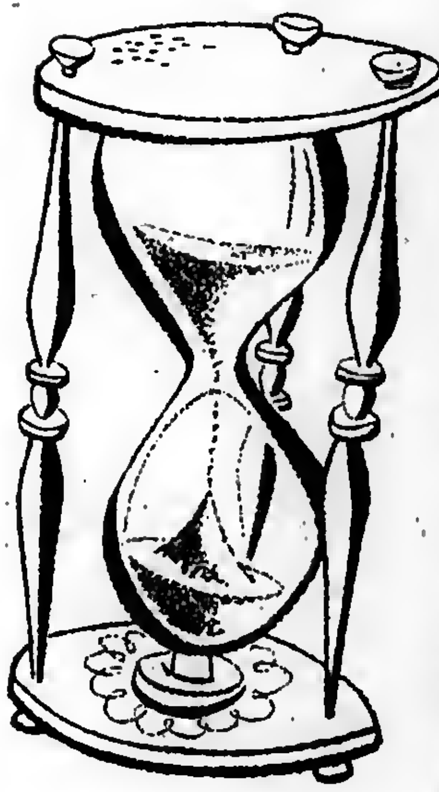

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WABASH
Six Months Ended June 30

	1977	1978
Shr Ernd	$.95	$.75
Revenue	44,227,000	20,079,000
Earnings	1,953,000	1,254,000

WYLY
Three Months Ended June 30

	1977	1978
Revenue	$19,000,000	$15,700,000
Disc Op	300,000	(91,200,000)
Loss	800,000	92,900,000
9 Mo Rev	35,000,000	31,100,000
Disc Op	300,000	(65,300,000)
Loss	1,900,000	87,900,000

a-Restated for discontinued operations.

AUTOMATIC DATA PROCESSING
Year Ended June 30

	1977	a1078
Shr Ernd	$1.58	$1.24
Revenue	245,487,000	190,244,000
Earnings	23,309,000	19,732,000
3 Mo Shr	.45	.36
Revenue	64,554,000	55,347,000
Earnings	9,850,000	8,403,000

a-Restated for pooling-of-interests transactions.

BOLT BERANEK & NEWMAN
Year Ended June 30

	1977	1978
Shr Ernd	....	$.47
aRevenue	$28,573,200	23,025,000
Disc Op	590,400	(958,700)
Loss	924,900	281,300
3 Mo Shr	.....	.11
aRevenue	9,077,700	5,957,700
Disc Op	50,300	(233,300)
Earnings	(1,103,900)	134,000

a-Sales from continuing operations

GENERAL COMPUTER SYSTEMS
Year Ended June 30

	1977	1976
Shr Ernd	$.83	.....
Revenue	13,099,000	$9,492,000
Tax Cred	940,000	.....
aSpec Cred	455,000	.....
Earnings	1,913,000	(3,016,000)

a-From settlement of debt.

MANAGEMENT ASSISTANCE
Three Months Ended June 30

	1977	1976
Shr Ernd	$.58	a$.42
Revenue	38,400,000	31,600,000
Tax Cred.	1,900,000	1,100,000
Earnings	4,300,000	3,200,000
9 Mo Shr	1.50	a1.21
Revenue	110,100,000	89,700,000
Tax Cred	4,900,000	3,900,00
Earnings	12,200,000	9,200,000

a-Adjusted to reflect one-for-four reverse stock split in October 1079.

MEMOREX
Three Months Ended Sept. 30

	a1977	1978
Shr Ernd	$2.17	$1.80
Revenue	114,131,000	84,320,000
Tax Cred	5,722,000	3,909,000
Earnings	14,100,000	10,293,000
9 Mo Shr	9.47	4.09
Revenue	329,089,000	244,878,000
Tax Cred	19,342,000	10,835,000
Earnings	40,010,000	29,832,000

a-Includes nine-months operating results of SST, subsidiary acquired in July 1077 on a pooling-of-interests basis.

3M
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$.94	$.83
Revenue	1,005,000	891,700
Earnings	109,800	96,500
8 Mo Shr	1.99	1.43
Revenue	1,941,000	1,720,000
Earnings	195,200	164,400

MODULAR COMPUTER SYSTEMS
Three Months Ended June 30

	1977	1979
Shr Ernd	$.19	.....
Revenue	13,930,000	$7,416,000
Earnings	512,000	(4,045,000)
9 Mo Shr	.28	.....
Revenue	26,840,000	17,293,000
Earnings	655,000	(3,077,000)

a-Restated to include the acquisition in 1077 of ECS Information Systems, Inc. on pooling-of-interests basis.

NCR
Three Months Ended Sept. 30

	1977 (000)	1976 (000)
Shr Ernd	$1.18	$.93
Revenue	604,245	569,804
aEarnings	33,322	25,049
9 Mo Shr	3.02	2.10
Revenue	1,747,287	1,596,687
aEarnings	64,355	56,778

a-Includes pretax gain of $2,530,000 from sale of securities in 1977 and pretax gain of $2,134,000 from sale of a subsidiary in 1978.

RAPIDATA
Three Months Ended Sept. 30

	1977	1979
Shr Ernd	$.10	$.03
Revenue	4,399,000	3,925,000
Earnings	194,095	49,994
9 Mo Shr	.39	.18
Revenue	13,439,000	11,493,000
Earnings	a959,148	329,955

a-Includes $101,912 gain on sale of certain assets.

SHARED MEDICAL SYSTEMS
Three Months Ended June 30

	1977	1978
Shr Ernd	$.89	$.48
Revenue	10,887,000	9,720,000
Earnings	1,972,00	1,290,000
9 Mo Shr	1.09	.97
Revenue	21,201,00	17,134,000
Earnings	3,222,000	2,277,000

SOLA BASIC INDUSTRIES
Three Months Ended June 30

	1977	1978
Shr Ernd	$.35	a$.35
Revenue	45,099,118	42,445,841
Earnings	1,995,319	1,903,477

a-Adjusted to reflect a 50% stock dividend paid in November 1078.

SPERRY RAND
Three Months Ended Sept. 30

	1977 (000)	1978 (000)
Shr Ernd	$1.05	$.98
Revenue	844,328	778,155
Earnings	30,977	37,516
9 Mo Shr	2.03	1.90
Revenue	1,672,211	1,564,209
Earnings	77,393	72,327

T-BAR
Three Months Ended June 30

	1077	1976
Shr Ernd	$.25	a$.18
Revenue	2,170,348	1,805,297
Earnings	153,287	108,109
8 Mo Shr	.45	a.32
Revenue	3,955,078	2,910,504
Earnings	273,046	191,512

a-Adjusted for a 7.8% stock dividend paid in April 1977.

TELEDYNE
Three Months Ended June 30

	1977 (000)	1979 (000)
Shr Ernd	$2.06	a$2.49
Revenue	524,837	481,877
Earnings	25,388	31,972
8 Mo Shr	5.66	a4.64
Revenue	1,070,499	941,827
Earnings	60,401	65,190

a-Adjusted for a 3% stock dividend paid in May 1977

TELEX
Three Months Ended June 30

	1977	1978
Shr Ernd	$.04	$.11
Revenue	32,029,000	24,802,000
Earnings	1,585,000	1,136,000

TEBDATA SYSTEMS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.23	$.42
Revenue	3,211,000	2,899,000
Earnings	294,000	403,000
0 Mo Shr	1.01	1.04
Revenue	9,936,000	7,439,000
Earnings	1,173,000	966,000

TEXAS INSTRUMENTS
Three Months Ended June 30

	1977	1978
Shr Ernd	$1.21	$.99
Revenue	493,300,000	392,198,000
Earnings	27,831,000	22,899,000
8 Mo Shr	2.41	1.91
Revenue	955,221,000	761,595,000
Earnings	54,075,000	43,859,000

TRW
Three Months Ended June 30

	1977 (000)	1076 (000)
Shr Ernd	$1.18	$1.03
Revenue	925,600	743,600
Earnings	42,800	37,800
6 Mo Shr	2.02	1.75
Revenue	1,602,500	1,498,300
Earnings	74,200	64,300

TYMSHARE
Three Months Ended Sept. 30

	1077	a1976
Shr Ernd	$.40	$.27
Revenue	22,026,901	10,001,300
Earnings	1,774,694	1,180,396
9 Mo Shr	1.81	1.21
Revenue	72,009,157	62,270,324
Earnings	8,622,669	6,252,867

a-Restated to reflect acquisition on pooling-of-interests basis.

WANG LABORATORIES
Three Months Ended Sept. 30

	1077	1979
Shr Ernd	$.18	a$.10
Revenue	39,221,000	24,369,000
Earnings	1,999,000	1,011,000
Year Ended June 30		
Shr Ernd	$.88	$.60
Revenue	134,335,000	99,958,000
Earnings	9,124,000	8,172,000

a-Adjusted for a Class B stock dividend paid in July 1977.

AMDAHL
Three Months Ended July 1

	1077	1979
Shr Ernd	$1.43	$.38
Revenue	45,087,000	13,827,000
Tax Cred	8,190,000	807,000
Earnings	11,045,000	1,681,000
9 Mo Shr	2.72	.90
Revenue	83,094,000	28,291,000
Tax Cred	0,095,000	1,473,000
Earnings	21,228,000	3,074,000

AMERICAN MICROSYSTEMS
Three Months Ended July 2

	1977	1978
Shr Ernd	$.27	$(2.39)
Revenue	19,145,000	15,813,000
Earnings	937,000	(5,298,000)
9 Mo Shr	.48	(4.10)
Revenue	34,959,000	32,035,000
Earnings	1,127,000	(9,149,000)

AMPEX
Three Months Ended July 30

	1977	1979
Shr Ernd	$.41	$.17
Revenue	70,774,000	95,449,000
Tax Cred	1,890,000	679,000
Earnings	4,522,000	1,912,000

ANALOG DEVICES
Three Months Ended July 30

	1077	1979
Shr Ernd	$.40	a$.31
Revenue	13,979,499	10,499,451
Earnings	774,941	831,397
9 Mo Shr	1.03	a.98
Revenue	39,282,051	26,911,989
Earnings	1,836,430	1,409,990

a-Adjusted to reflect 5% stock dividend paid in April 1977.

AVX
Three Months Ended July 2

	1877	1978
Shr Ernd	$.95	$.47
Revenue	11,145,000	9,742,000
Earnings	731,000	527,000
6 Mo Shr	1.01	.73
Revenue	20,938,000	19,232,000
Earnings	1,139,000	929,000

BALL
Three Months Ended Oct. 2

	1977	1976
Shr Ernd	$.99	$.75
Revenue	119,911,000	103,898,000
Earnings	4,195,000	4,741,000
9 Mo Shr	2.55	2.39
Revenue	342,938,000	301,409,000
Earnings	11,923,000	11,061,000

CIE. DES MACHINES BULL
18 Months Ended June 30

	1977	a1978
Earnings	b$11,100,000	.....

a-Comparative figures unavailable; company has changed to a fiscal year ending June 30. b-Computed at the French franc's current rate.

COMPUGRAPHIC
Three Months Ended July 2

	1977	1079
Shr Ernd	$1.07	$.95
Revenue	34,177,000	29,254,000
Earnings	2,477,000	2,048,000
9 Mo Shr	3.11	2.78
Revenue	95,125,000	70,490,000
Earnings	7,134,000	5,489,000

COMPUTER AUTOMATION
Three Months Ended Oct. 2

	1077	1979
Shr Ernd	.99	.37
Revenue	11,993,000	7,854,000
Earnings	1,315,000	723,000
Year Ended July 3		
Shr Ernd	$2.70	$1.60
Revenue	43,039,000	30,399,000
Earnings	8,317,000	3,099,000

COMPUTER PRODUCTS
Three Months Ended July 1

	1977	1978
Shr Ernd	$.14	a$.09
Revenue	2,111,505	1,449,643
Earnings	190,408	129,957
8 Mo Shr	.25	a.17
Revenue	4,004,864	2,796,293
Earnings	359,230	243,274

a-Reflects 20% stock dividend in November 1979.

COMPUTER SCIENCES
Three Months Ended July 1

	1977	1078
Shr Ernd	$.22	$.23
Revenue	84,134,000	55,541,000
Tax Cred	.....	750,000
Earnings	3,150,000	3,299,000

COMTEN
Three Months Ended July 1

	1977	1979
Shr Ernd	$.19	$.12
Revenue	8,255,000	8,479,000
Tax Cred	146,000	149,000
Earnings	494,000	314,000
6 Mo Shr	.35	.17
Revenue	18,430,000	11,869,000
Tax Cred	266,000	109,000
Earnings	901,000	441,000

a-Adjusted for three-for-one stock split in November 1079.

DATAPOINT
Year Ended July 31

	a1977	1078
Shr Ernd	$2.59	$2.10
Revenue	103,023,000	72,050,000
Tax Cred	.....	405,000
Earnings	9,739,000	6,431,000
3 Mo Shr	.72	.57
Revenue	29,914,000	21,440,000
Earnings	2,353,000	1,870,000

a-Includes results of Amcomp, Inc. from Jan. 17, 1977 date of acquisition.

DATARAM
Three Months Ended July 31

	1977	1979
Shr Ernd	$1.03	$.31
Revenue	3,703,000	1,781,000
Tax Cred	.....	90,000
Earnings	480,000	157,000

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HOUSTON
Suite 960E
4615 Southwest Frwy.
Houston, TX 77027
(713)960-9102

KANSAS CITY
Suite 502
6405 Metcalf
Shawnee Mission
Kansas 66202
(913)236-8288

TULSA
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SENIOR DESIGN ENGINEER - FIRMWARE

BSEE or BS in Computer Science with 2 to 3 years' experience in software development of real time mini-micro computer systems Experience with I/O drivers for devices such as cassettes, magnetic tapes, floppy disks or disks is preferable.

FIRMWARE ENGINEER - DIAGNOSTICS

Minimum 2 years' experience in hardware design, programming in assembly language of micro computers. Diagnostics programming a definite plus. BSEE or equivalent desired.

SENIOR ENGINEER - ANALOG

Requirements include BSEE degree with MSEE desired and seven years experience in either CRT display systems or data communication circuit design. CRT display systems experience must include knowledge of analog electronics, deflection components, flyback HV generation, and CRT characteristics. Data communication circuit design experience must include knowledge of analog/digital techniques for transmitting data over long cables.

SENIOR MECHANICAL ENGINEER

A BSME is required, MSME highly desirable, plus at least 7 years' experience in the design of products involving small, high reliability mechanisms, preferably in the printed field or related to computer peripherals. Your background should include leadership responsibility on development projects

INDUSTRIAL ENGINEER

Minimum 2 years' experience with printed circuit board assembly methods a must, electro-mechanical assembly experience a definite plus; should be experienced in processing and standards. A degree in E E. or equivalent experience is needed.

USER LANGUAGE DEVELOPMENT

Participate in the development of COBOL/BASIC/RPG II Compilers and associated interpreters for Sycor 400 Series equipment. Responsibilities include language development, design and implementation. BS or MS in Computer Science or related field with relavant course work and/or experience. Knowledge of block structured language and one of COBOL/BASIC/RPG 11. Machine level programming, especially 8080 or other microprocessor would be a plus.

SYSTEMS LANGUAGE DEVELOPMENT

Participate in development of Sycor systems implementation language, SYCLOPS. Responsibilities include language development, compiler development, code generation for new microprocessors and application of source optimization techniques. BS or MS in computer science or related field with relevent course work and/or experience. Knowledge of block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

DBMS DEVELOPMENT

Participate in the development of a generalized DBMS for Sycor systems using state of the art technique. BS or MS in computer Science or related field with emphasis on data structures and DBMS. Knowledge of a block structued language and machine level programming, preferably for 8080 or other microprocessor is a plus.

TECHNICAL WRITERS

Strong background in digital logic and minimum 1 year experience in writing about digital logic and computer related modules required. BSEE or equivalent necessary. You will research and write technical manuals used by our field service personnel when performing maintenance of Sycor terminals. Bachelor's degree desired.

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SYCOR

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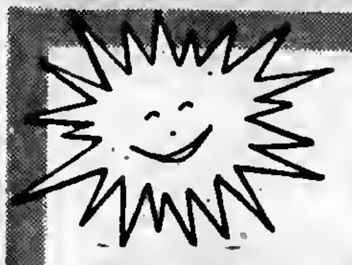

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- Project Management potential/experience.

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We desire four or more years' experience in software development tools such as compilers, editors, operating systems and debuggers. Will have responsibility for defining and implementing software development systems for microprocessor based systems. A BS or MS is required. 8080 experience is desirable.

Diagnostic Programmer

Three or more years' mini or micro-computer systems experience is required. Responsibilities will entail development of software and firmware diagnostics for current and next generation systems. Requires a BS or equivalent.

For more discussion and an interview please forward your resume in complete confidence to, or call, Bob Hasselbrink COLLECT at (408) 737-5640. National Semiconductor Corporation, 2900 Semiconductor Drive, Santa Clara, California 95051. We are an equal opportunity employer male/female/handicapped.

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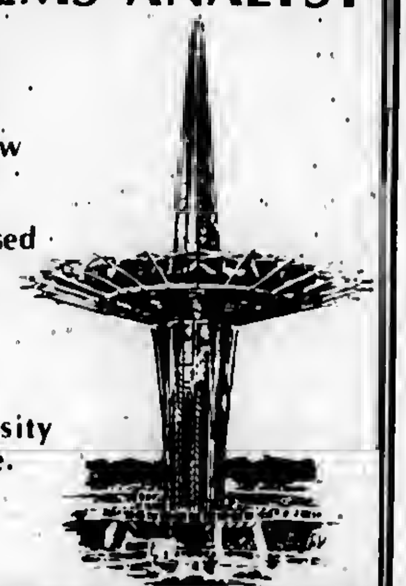

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Send your resume in confidence to Gerald Clancey, Director of Software Development, Data General Corp., 1100 Navaho Dr., Raleigh, NC 27609. Or call him collect at (919) 872-4710.

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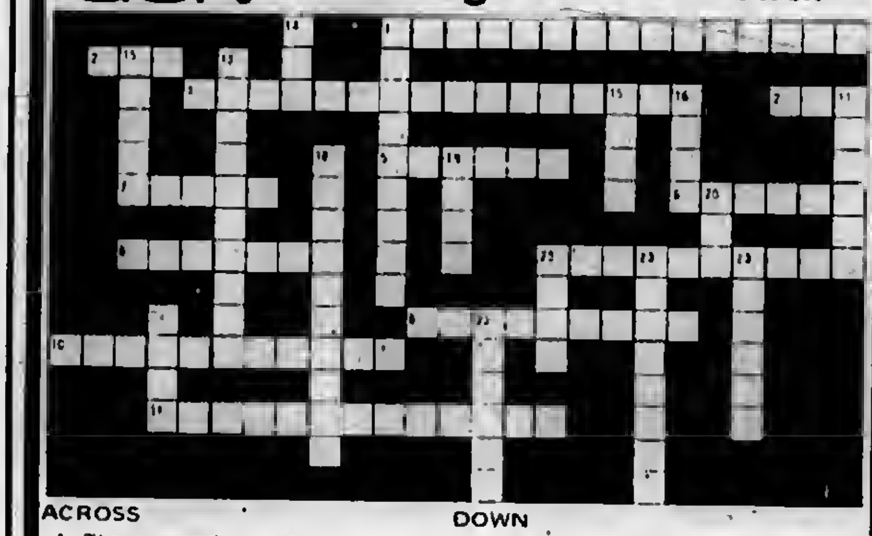

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12. Dartmouth language
13. Funcational module
14. The increment by which programmers slowly go mad
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16. Programmer reaction when it runs right the first time
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PLANNING RESEARCH CORPORATION, the world's largest diversified professional services company providing government and industry with professional skills of more than 5000 experts in over 100 technical disciplines, is expanding its information services activities. We are seeking data processing professionals with experience in the following areas:

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H-6000

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The University of New Hampshire is located in the community of Durham, little more than an hour removed, by public transportation, from Boston, Mass. and Portland, Me.

The University's DEC system 10 computer, through the Office of Computer Services, provides both batch and timesharing services to the entire University community - for administration, instruction and research.

The University, an Affirmative Action/Equal Opportunity employer, is currently seeking qualified professionals in the following areas:

ASSISTANT DIRECTOR, MIS

(Computer Specialist V) Coordinate/supervise MIS Team Leaders in developing, designing and implementing standards, procedures, policies, and educational programs for MIS systems and personnel as well as design, development, maintenance and production of MIS systems. Minimum qualifications: Bachelor's degree or equivalent plus six years experience including three years in supervisory capacity. Knowledge of DEC system-10 and data base experience desirable. Salary range: $16,944 to $26,276, normally starting salary not to exceed $19,026.

The following three positions are classified as Computer Specialist III. Minimum qualifications: Bachelor's degree or equivalent experience plus three years of appropriate experience. Salary range: $12,780 to $19,824, normally starting salary not to exceed $14,322.

SYSTEMS PROGRAMMER

Generate and maintain Operating System Monitor, collect and analyze performance statistics, modify Monitor as required, maintain and modify other systems software. DEC system-10 experience or operating systems work on large-scale timesharing systems desirable.

DATA ENTRY COORDINATOR

Supervise data entry personnel, oversee training of user's in various data entry methods, analyze needs, research available data entry hardware and software, recommend acquisition and oversee installation of same. Knowledge of DEC system-10 and data entry devices desirable.

PROGRAMMER ANALYST-SERVICES

Collaborate with team leaders and other team members in designing, developing, and implementing computer applications in the auxiliary service areas (residential life, dining services, and safety services). Knowledge of DEC system-10, data base experience plus heavy COBOL is desirable.

The following two positions are classified as Computer Specialist II. Minimum qualifications: Bachelor's degree or equivalent experience plus one year's pertinent experience. Salary range: $11,616 to $18,048, normally starting salary not to exceed $13,020.

ASSISTANT MANAGER/OPERATIONS

Oversee scheduling of administrative production jobs, be responsible for maintaining inventory of all computer supplies, supervise output dissemination section. Scheduling and operating experience desirable.

PROGRAMMER ANALYST - FINANCIAL

Participate as a team member in analysis, design, and programming projects, acquire a general overview of all financial team systems, and submit, monitor and check production runs as assigned. Knowledge of DEC system-10, COBOL and data base experience desirable.

The following four positions are classified as Computer Specialist I. Minimum qualifications: Associate's Degree in Data Processing or equivalent experience. Salary range: $10,572 to $16,428, normally starting salary not to exceed $11,856.

PROGRAMMER ANALYST - STUDENT RECORDS

Gain familiarity with Student Records area (including Admissions, Alumni, and Development systems) by performing programming and production tasks as assigned. Participate as a team member in maintenance and development projects. Knowledge of COBOL is desirable.

PROGRAMMER ANALYST - ACADEMIC CLUSTERS

(three positions) Consult with and aid users of terminal clusters and assist Team Leader as required. Knowledge of DEC system-10 as well as a programming language is desirable.

Resumes should be submitted no later than November 21, 1977, to:

Mr. William J. Vasiliou, Director
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MINI-COMPUTERS

Two years experience on PDP-11, RSX-11, or RSTS/E, operating systems desirable. Commercial applications system design experience utilizing Assembly Language, FORTRAN IV or PDP-11 TOTAL preferred.

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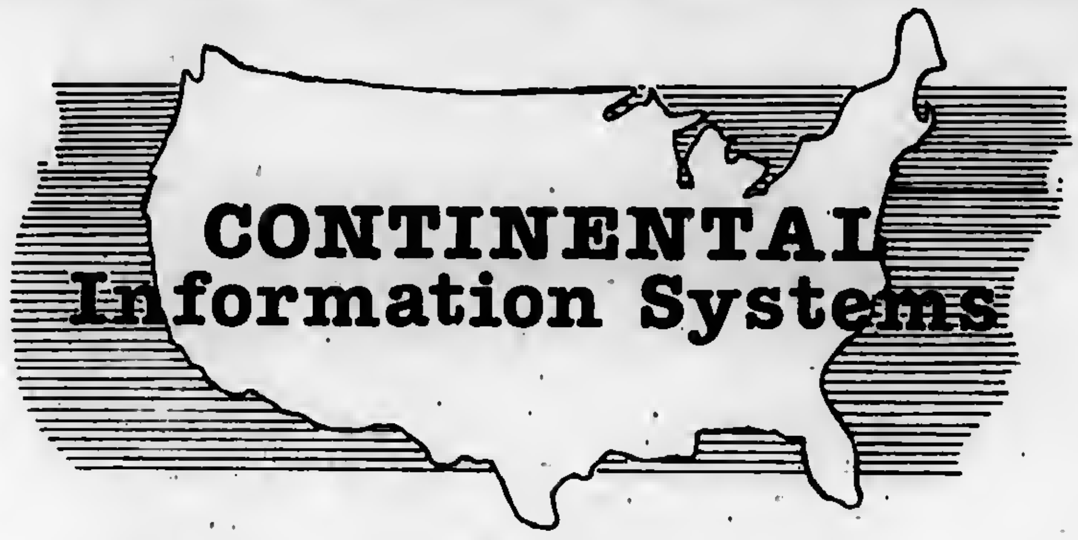

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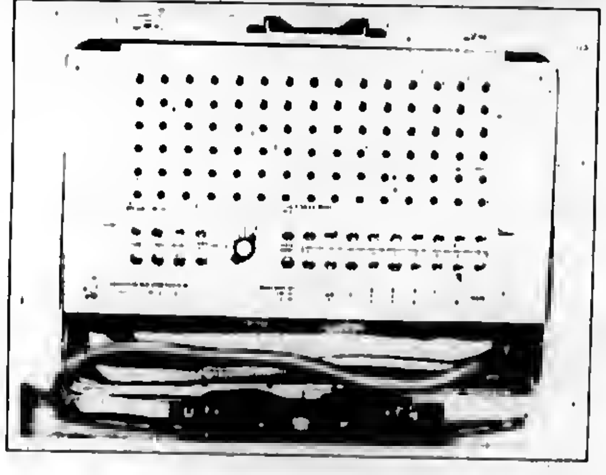

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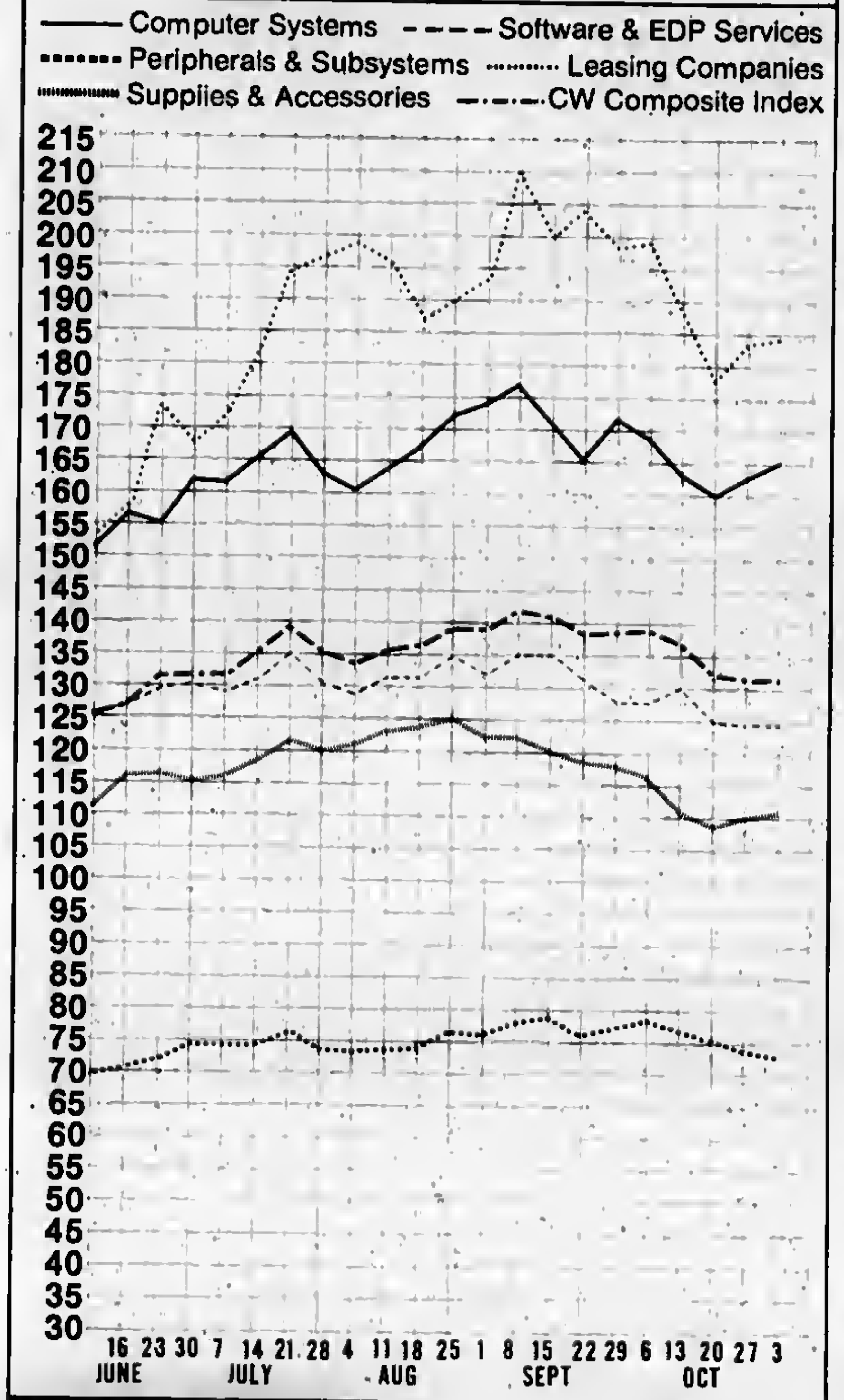

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aShr Ernd	$1.00	$.39
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Earnings	1,550,987	533,725
a8 Mo Shr	1.83	.78
Revenua	17,678,570	9,419,480
Earnings	2,538,130	1,037,621

a-Reflects adjustment for three-for-one stock split elfective May 28, 1076.

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Three Months Ended Oct. 1

	1977 (000)	1978 (000)
Shr Ernd	.66	a.43
Revenue	302,838	204,542
Earnings	26,358	16,705

Year Ended July 2

Shr Ernd	$2.78	e$1.88
Revenue	1,058,814	736,288
Earnings	108,458	73,400

a-Adjusted for three-for-ona stock split in November 1976.

EG&G
Three Months Ended July 3

	1977	1876
Shr Ernd	$.41	$.33
Revenue	86,325,000	61,057,000
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Earnings	5,075,000	4,004,000

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Three Months Ended July 1

	1977	1978
Shr Ernd	$(.10)	$.22
Revenue	5,411,000	6,247,000
Disc Op	......	544,000
Tax Cred	35,000	254,000
Earnings	(254,000)	582,000
8 Mo Shr	(.43)	(.13)
Revenue	11,094,000	11,751,000
Disc Op	.....	544,000
Tex Cred	87,000	264,000
Loss	1,138,000	352,000

FABRI-TEK
Three Months Ended July 1

	1977	1978
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEONESDAY, NOVEMBEP 2, 1977

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Cambridge, Mass. 02139

COMPUTEP SYSTEMS

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
)	AMOAHL CORP	22- 44	38	-1 1/4	-3.1
N	BURROUGHS CORP	55- 91	63 7/8	-2 3/8	-3.5
J	COMPUTER AUTOMATION	18- 30	24 3/4	+1 3/4	+7.6
N	CONTROL DATA CORP	20- 26	20	-1 3/8	-6.4
O	CRAY RESEAPCH INC	15- 29	21 1/4	-1	-4.4
N	DATA GENERAL CORP	35- 51	44 5/8	- 3/8	-0.8
N	DATAPOINT CORP	18- 32	31 5/8	+3 3/8	+11.9
N	DIGITAL EQUIPMENT	37- 53	43 1/2	-1 1/2	-3.3
N	ELECTRONIC ASSOC.	2- 3	2	+ 1/8	+6.6
A	ELECTRONIC ENGINEEP.	8- 11	9 7/8	+ 1/4	+2.5
)	FOUP-PHASE SYSTEMS	13- 19	17 1/8	+ 1/2	+3.0
N	FOXBORO	41- 54	42 1/2	- 1/4	-0.5
]	GENERAL AUTOMATION	6- 9	5 3/4	- 1/4	-4.1
O	GRI COMPUTER CORP	1- 1	5/8	+ 1/8	+25.0
N	HEWLETT-PACKARD CO	69- 87	70 3/8	- 1/8	-0.1
N	HONEYWELL INC	43- 55	43 3/8	-2 1/4	-4.9
N	IBM	245-286	249 5/8	-10 7/8	-4.1
C	MANAGEMENT ASSIST	5- 9	8	+ 7/8	+12.2
O	MICRODATA CORP	7- 18	11 1/4	- 1/8	-1.0
D	MODULAP COMPUTER SYS	5- 8	7 1/4	+1	+16.0
N	NCP	32- 47	40	-1 1/2	-3.6
O	PPIME COMPUTEP INC	12- 23	19 1/8	-1 3/8	-6.7
N	PERKIN-ELMER	17- 22	17 7/8	- 7/8	-4.6
N	RAYTHEON CO	16- 33	28 7/8	-1	-3.3
N	SPERRY RAND	30- 42	31 3/8	+ 5/8	+2.0
O	SYCOR INC	8- 15	14	0	0.0
A	SYSTEMS ENG. LABS	5- 8	6 5/8	- 1/4	-3.6
A	WANG LABS.	10- 14	10 3/8	- 3/4	-6.7

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
]	ALANTHUS CORP	3- 5	4 1/2	0	0.0
C	BOOTNE COURIER CORP	8- 10	10 3/4	+ 3/8	+3.6
O	CONDISCO INC	10- 13	10 3/4	+ 1/4	+2.3
A	CONMERCE GROUP CORP	1- 3	7/8	0	0.0
A	COMPUTER INVSTKS GRP	1- 2	1	0	0.0
N	OATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2	0	0.0
N	OPF INC	6- 9	8	+ 1/8	+1.5
N	ITEL	13- 22	17 3/8	- 1/8	-0.7
N	LEASCO CORP	19- 27	22 7/8	+ 1/2	+2.2
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEEK TEX CORP	5- 11	5 3/8	0	0.0
N	U.S. LEASING	10- 15	12 5/8	+ 1/8	+1.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
C=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EOP SERVICES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1/2	0	0.0
O	ANACOMP INC	7- 10	8 3/4	+ 1/4	+2.9
A	APPLIED DATA RES.	5- 10	7 1/4	- 1/4	-3.3
N	AUTOMATIC DATA PROC	23- 30	26	- 1/2	-1.8
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	9 3/4	0	0.0
3	COMP ELECTION SYSTMS	6- 10	9 1/2	+ 1/2	+5.5
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 3/8	+ 1/8	+1.3
N	COMPUTER SCIENCES	7- 9	7 5/8	- 1/8	-1.6
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	- 1/8	-8.3
O	CONSHARE	5- 8	6 3/4	+ 1/4	+3.8
O	DATA DIMENSIONS INC	3- 5	4 3/8	+ 1/4	+6.0
3	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	14 1/4	+ 1/4	+1.7
J	IMSYTE CORP	2- 3	1 1/4	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2	+ 3/8	+23.0
O	KEANE ASSOCIATES	3- 4	3 7/8	- 3/8	-8.8
O	KEYDATA CORP	2- 3	1 1/2	0	0.0
A	LOGICON	7- 17	11 3/4	- 5/8	-5.0
A	MANAGEMENT DATA	1- 2	1 1/8	+ 1/8	+12.5
A	NATIONAL CSS INC	19- 27	25 5/8	+1 1/2	+6.2
O	NATIONAL DATA CORP	4- 7	5 7/8	- 1/4	-4.0
A	ON LINE SYSTEMS INC	16- 22	17	+ 5/8	+3.8
N	PLANNING RESEARCH	3- 6	3 7/8	0	0.0
O	PROGRAMMING & SYS	1- 1	1/4	- 1/8	-33.3
O	RAPIDATA INC	2- 3	2 3/8	- 1/4	-9.5
O	REYNOLDS & REYNOLD	17- 20	17 3/4	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 4	3 1/2	+ 1/4	+7.6
O	TYMSHARE INC	14- 23	18 1/2	- 3/8	-1.9
A	URS SYSTEMS	4- 5	4 5/8	+ 1/4	+5.7
A	WYLY CORP	1- 2	3/4	0	0.0

PERIPNERALS & SUBSYSTENS

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	12 7/8	0	0.0
O	ADVANCED MEMORY SYS	7- 9	7	+ 1/4	+3.7
N	AMPEX CORP	8- 11	8 3/4	- 1/2	-5.4
O	ANDERSON JACOBSON	3- 5	3 3/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	13 1/8	- 3/8	-2.7
O	BEEHIVE INT'L	6- 12	5 7/8	-1 7/8	-24.1
A	BOLT,BERANEK & NEW.	7- 9	6 3/4	- 5/8	-8.4
N	BUNKER-RAMO	8- 12	10	- 3/8	-3.6
A	CALCOMP	3- 5	2 5/8	- 3/8	-12.5
O	CAMBRIDGE MEMORIES	1- 4	3	- 3/8	-12.4
N	CENTRONICS DATA COMP	20- 30	19 7/8	- 5/8	-3.0
J	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6	+ 3/8	[illegible]
J	COMPUTER CONSOLES	4- 7	3 3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2 3/4	- 1/4	-8.3
J	COMPUTER TRANSCEIVER	1- 1	1 1/4	0	0.0
O	COMTEN	9- 13	9 1/2	- 1/4	-2.5
N	CONRAC CORP	19- 28	19 5/8	- 1/4	-1.2
J	DATA ACCESS SYSTEMS	4- 5	3	- 1/2	-14.2
O	DATA 100	6- 9	7 3/8	0	0.0
A	DATA PRODUCTS CORP	9- 17	15 5/8	0	0.0
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
J	DATUM INC	1- 2	1 3/4	0	0.0
O	DECISION DATA COMPUT	2- 3	1 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 5/8	+ 1/2	+7.0
O	DATARAM CORP	2- 12	9 1/2	- 3/4	-7.3
A	ELECTRONIC M & M	4- 5	3 1/2	- 1/8	-3.4
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1	- 1/8	-11.1
N	HAZELTINE CORP	8- 12	8 1/4	+ 1/8	+1.5
N	HARRIS CORP	28- 39	37 3/4	+ 7/8	+2.3
A	INFOTERM CORP	10- 17	16 3/4	- 1/4	-1.4
O	INFOREX INC	4- 7	4 7/8	- 1/8	-2.5
O	INFORMATION INT'L INC	9- 14	9 1/2	- 1/4	-2.5
O	INTEL CORP	38- 57	42	-1	-2.3
A	LUNDY ELECTRONICS	3- 6	4 3/8	+ 1/4	+6.0
O	MSI DATA CORP	6- 13	11 3/8	- 1/2	-4.2
O	MEMOREX	23- 34	24 7/8	-1 7/8	-7.0
N	MOHAWK DATA SCI	5- 8	5	- 3/8	-6.9
J	PENRIL CORP	2- 5	4 3/4	+1	+26.6
N	PERTEC CORP	7- 9	8 7/8	+ 1/8	+1.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
J	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 1/2	0	0.0
J	RECOGNITION EQUIP	6- 10	6 7/8	- 1/8	-1.7
O	SCAN-DATA	1- 2	7/8		-6.7
J	STORAGE TECHNOLOGY	10- 18	16 1/4	+ 1/8	+0.7
J	T BAR INC	7- 13	11 3/8	+ 3/4	+7.0
O	TALLY CORP.	4- 6	3 1/2	- 3/8	-9.6
A	TEC INC	7- 10	7 1/8	- 1/4	-3.3
N	TEKTRONIK INC	29- 38	36 7/8	- 1/8	-0.3
N	TELEX	2- 3	2 1/4	+ 1/8	+5.8
O	WILTEK INC	1- 1	3/4	+ 1/4	+50.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	5 3/4	- 1/8	-2.1
]	BALTIMORE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	12 1/2	0	0.0
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	16 7/8	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 7/8	+ 1/8	+2.1
J	GRAHAM MAGNETICS	11- 17	17	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	15	+ 3/4	+5.2
N	3M COMPANY	46- 56	46 1/4	- 1/4	-0.5
O	MOORE CORP LTD	24- 37	23 3/4	- 1/4	-1.0
[illegible]	NASHUA CORP	[illegible]	[illegible]	[illegible]	[illegible]
O	STANDARD REGISTER	18- 25	21	- 1/4	-1.1
O	TAB PRODUCTS CO	10- 19	9 1/2	- 1/4	-2.5
N	VARCO	18- 22	18	- 1/2	-2.7
A	WABASH MAGNETICS	10- 15	11 7/8	+ 5/8	+5.5
N	WALLACE BUS FORMS	17- 21	18 5/8	0	0.0

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Photo by Linda Thomas

Different Strokes . . .

Three crews competing in the annual Head-of-the-Charles Regatta in Cambridge, Mass., race under a bridge on the Charles River. Two CPUs in Waltham, Mass., linked to terminals on the river banks helped time 720 entries. Story on Page 5.

IBM a DP Monopoly, Moved Against Rivals, Internal Memos Admit

By Catherine Arnst
CW Staff

NEW YORK – An IBM attorney admitted as early as 1963 that the firm maintained an "almost unchallenged monopoly position" in the computer industry, according to an internal company memo placed into evidence in the U.S. vs. IBM antitrust trial here.

Other newly introduced documents indicate IBM chose to unbundle its software and services prices from the hardware prices of its systems not only because of antitrust considerations, but also to control the growth of rival leasing companies.

The documents are part of a group that IBM has been trying to keep out of the public record in the case for the past nine years through claims of attorney-client privilege [CW, Nov. 7].

The 1963 memo – from Ken Seggerman Jr., an attorney for the General Products Division, to that division's president, John W. Hannstra – stated that "we tend to adjust our product line and our prices not in response to competition in general, but to thwart competition on an individual basis."

This was because "our secondary objective, to which we have mistakenly given too high a priority, has been to maintain a relatively stable rate of growth," Seggerman said.

To meet that goal, IBM increased its rental and profit margins "in the face of gradually increasing competition (for example, the increase of 'normal' profit from 30% to 35%) and we have increased purchase prices even more in relation to rentals in an attempt to 'manage' the flow of profits despite much lower purchase rental ratios of our competitors," Seggerman told Hannstra.

The attorney asserted that it made "better business sense and better antitrust sense" to respond to long-term trends in the marketplace rather than current and near-term growth.

"I am confident that [IBM] could also survive retrenchment to meet the demise of our hitherto almost unchallenged monopoly position," Segger-

(Continued on Page 6)

Bill Would Create Privacy Board

By Nancy French
CW Staff

WASHINGTON, D.C. – A bill has been introduced in the House of Representatives that would create a Federal Information Practices Board to review and report on fair information and privacy practices of government agencies and to a certain extent business organizations.

In keeping with the recommendations of the Privacy Protection Study Commission issued last July, the board would have no enforcement powers. However, it would oversee implementation of the Privacy Act of 1974 – a function now left largely undone.

The board would also assume some of the functions concerning the private sector previously performed by the now defunct Privacy Protection Study Commission that conceived it.

Introduced by Representatives Barry Goldwater Jr. (R-Calif.) and Edward I. Koch (D-N.Y.) only a week before Koch was elected mayor of New York City, H.R. 9986 assigns the board responsibilities for reviewing the effect of governmental and business information practices on individuals and their privacy.

It also assigns to the board the function of "investigating" the privacy implications of transnational data flows, electronic funds transfer, criminal history information and census activities.

The board would be composed of five full-time members appointed by the President and approved by the Senate. They would include persons repre-

(Continued on Page 2)

Senate Launches Trial EFT Bill

By Edith Holmes
CW Staff

WASHINGTON, D.C. – A U.S. senator has introduced legislation that would permit banks and other financial institutions to establish Electronic Funds Transfer (EFT) facilities despite branch banking laws that currently limit the proliferation of EFT terminals.

Characterizing his bill as a trial balloon, Sen. Thomas J. McIntyre (D-N.H.) said that while the legislation would implement the recent recommendations of the National Commission on Electronic Fund Transfers [CW, Nov. 7], its chief intent "is to

(Continued on Page 6)

Single Modem Combines Data Sets From Vadic, Bell

By Ronald A. Frank
CW Staff

SUNNYVALE, Calif. – A microprocessor-controlled modem that is reportedly compatible with three commonly used low-speed data sets has been introduced by Vadic Corp.

The VA3467 can automatically recognize data received from a Bell System 103 and 212 and a Vadic 3400 data set, according to the vendor.

Vadic originated 1,200 bit/sec full-duplex transmission of data over a two-wire facility with the VA3400; this concept was followed several years later by AT&T with its 212 unit. The data sets use different modulation frequencies, however, and are not compatible.

The VA3467 is the first modem to combine both the Vadic and Bell capabilities into one unit along with the Bell 103 (300 bit/sec) speed, a spokesman claimed.

The automatic recognition sequence that identifies an incoming signal to the VA3467 operates under microprocessor control and does not disturb normal connect protocols for any specific modem, Vadic said. Terminal interface operation is transparent to the modem type used.

Computers that are compatible with any of the three modem types used in the VA3467 will operate with the unit "without altering hardware and software," the company said.

Users who want to order the VA3467 without its full capabilities can later upgrade the unit in the field depending on modem combinations installed, the spokesman noted.

(Continued on Page 5)

'Marginal People'

By Don Leavitt
CW Staff

NEW YORK – "Lots of programmers ... struck me as marginal people" and "managers use structured programming to de-skill and control their programmers" are keystone thoughts of a recent book describing the "routinization" of programming in the U.S.

In *Programmers and Managers*, sociologist Philip Kraft said he got to know many programmers as neighbors, students and colleagues in Binghamton, N.Y. He tagged them "marginal" just before noting "they didn't fit neatly into the stereotypes commonly applied, however unjustly, to engineering workers as a whole.

"They did not look like engineers are supposed to look (crew-cuts, narrow ties, penny loafers, etc.), nor were they taciturn and awkward around nonprogrammers. They did not appear to be particularly conservative, either politically or socially."

And, finally, "many were women."

On the other hand, Kraft added, if programmers could "pass" as nonengineers in a nonengineering world, "they were not exactly academics or managers or salespeople either."

After outlining the myriad titles

(Continued on Page 4)

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Judge Agrees to Replace Examiner

By Catherine Arnst
CW Staff

NEW YORK — Judge David N. Edelstein granted "with reluctance" a government motion that the person it requested to examine IBM files in the U.S. vs. IBM antitrust trial now be removed.

Herbert H. Isaacs, a director of Arthur Young & Co., was appointed by Edelstein in August to search IBM corporate files for statistical information on the firm's installed systems [CW, Sept. 12].

The government originally suggested Isaacs' name, but then requested its removal [CW, Oct. 31] after IBM filed a writ of mandamus with the Second Circuit Court of Appeals complaining of a conflict of interest — the accountant was also working for Memorex Corp. as a paralegal in its antitrust suit against IBM [CW, Oct. 10].

In his order last week, Edelstein said "the court remains convinced that its appointment of Mr. Isaacs as examiner was within its sound discretion. There was not then, nor is there now, a conflict of interest or appearance of conflict resulting from Mr. Isaacs' nonadversarial support role with Memorex.

"Despite these convictions, however, the court has determined with reluctance that the elements of delay are such that the government's motion should be granted. Resolution of defendant's proceeding in the court of appeals is not likely to occur until sometime in 1978." The judge added that he hoped the expedition of the 2-1/2-year-old trial would be served by granting the government's motion.

However, IBM will probably take issue with this order, too, as it contains some of the same procedures to which the firm objected when Isaacs was appointed. IBM's writ complained that the government did not consult with it prior to submitting a list of persons to the court for appointment and that the firm had only one day to object to any of those persons.

Edelstein's current order also allowed IBM only 24 hours to respond to a list of government-selected names. In addition, IBM wants only a lawyer, not an accountant, to be appointed as examiner, while Edelstein "is convinced that [the] choice of a nonlawyer to act as examiner is entirely appropriate and may, in fact, serve to facilitate completion of the duties of the examiner," his order said.

Bill Creates Privacy Board

(Continued from Page 1)

senting law enforcement, business, computer and communications technology, civil rights and liberties and information security, Koch said recently on the House floor. Each member would serve for only one four-year term.

A part of the executive branch, the board would monitor and investigate compliance with federal fair information practices laws, including the Privacy Act of 1974, the Fair Credit Reporting Act, the Fair Credit Billing Act, the Family Educational Rights and Privacy Act of 1974, the Freedom of Information Act and the Government in the Sunshine Act.

No federal agency could publish any proposed rules implementing a fair information practices law without first consulting with the board, according to the bill.

In addition to its watchdog function, the board would also directly assist individuals with privacy complaints.

With a staff of as many as 50 civil servants, it would assist those individuals by providing them with clear statements of their rights and remedies under the applicable federal law and identifying the persons responsible for administering the appropriate law.

The board would also prepare and submit to the President and Congress an annual report that included a statement of its activities during the previous year and recommendations for action by the executive, legislative and judicial branches of the government and by the states and private sector.

The annual report would also include a review of any new information technologies and practices developed or marketed during that year.

The board would also prepare and submit to relevant agencies or business organizations, the President and Congress the results of any investigation deemed by the board to be "of significance."

H.R. 9986 gives the board subpoena power as well as the power to hold hearings and take testimony under oath.

Any agency that receives a report on an information practice which the board finds to be in violation of a federal fair information practices laws would have to prepare and submit to the board, the President and Congress a written statement describing the measures taken to alleviate or remove any problems or deficiencies identified in the report, the bill said. This provision does not apply to business.

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Probe Finds Sci-Tek Violated Code of Conduct

By Ann Dooley
CW Staff

BOSTON — A state investigative committee has found Sci-Tek Asuciates, Inc. guilty of two violations of the state code of conduct and has barred the company from any further participation in a controversial $23 million facilities management contract fur the Administration and Finance Department (A&F).

While investigators concluded there was insufficient evidence to press criminal charges against the New Hampshire firm, Sci-Tek will be subject to administrative sanctions, state officials said.

And, as another result of the investigation by the Attorney General's Office, DP consultants will no longer be able to vote on any DP prucurement selection board in Massachusetts, they added.

The conflict of interest charges were made when it was discovered that two Sci-Tek officials were members of the contract selection committee that awarded the facilities management contract to Electronic Data Systems, Inc. (EDS) [CW, Sept. 19]. Sci-Tek and EDS were jointly involved in a $1.6 million contract in Tennessee during the time of the Massachusetts vendor selection process.

No action has been taken against EDS; that company is free to rebid for the contract if it wishes.

In an investigation requested by Gov. Michael S. Dukakis, the State Attorney General's Office interviewed other members of the contract selection board, Sci-Tek and EDS employees and Tennessee officials; it also reviewed records of communications between EDS and Sci-Tek.

The investigators found Sci-Tek had violated state codes whch prohibit conduct that might give the impression or raise a suspicion of improper activity.

In reviewing the selection process, it was found that EDS ranked fifth out of a field of five vendors which met the technical requirements. The first three bidders were invited to participate in the second phase of bidding; the other two were advised to exercise their own busines judgment.

However, all five bidders were very close in their bid responses, the investigators reported, and EDS believed there was no real impediment to its being awarded the contract. EDS' confidence was high, the firm's legal counsel said, because two of the five bidders were subsequently disqualified, the technical review was only 30% of the total evaluation, certain misunderstandings about parts of the EDS proposal had occurred and EDS' cost pruposal was much lower than those of the three top contenders.

Although Sci-Tek became interested in the Tennessee contract in late December, about the same time as the technical review, both companies claimed there was no contact between them concerning the Tennessee contract until early February.

Several phone calls were made between the two companies (one on the same day Sci-Tek became interested in the Tennessee contract), but both firms said they were concerned only with the Massachusetts contract.

In the contract award procedure's cost performance proposal phase, which took place in January, all selection board members ranked EDS first among the bidders. One week after that evaluation, EDS, Sci-Tek and Tennessee ufficials met to discuss the contract.

EDS asserted it had no knowledge that a vote was about to or had just taken place by the Massachusetts board when it was first contacted by Sci-Tek. Company officials also stated that the Tennessee contract was an "arms-length transaction" only. After examining the contract, the investigators concurred with that statement.

EDS officials also said they sought and received assurances from Sci-Tek that there would be no conflict of interest between the two contracts. Sci-Tek requested and received such an assurance from the selection board, although neither the A&F Secretary nor the Attorney General were consulted, investigators learned.

Investigators did find that Sci-Tek's conduct in "discussing the [Tennessee] proposal with individuals associated with the firms they were evaluating for the Massachusetts contract before the results of the evaluation were final and public" violated Massachusetts law.

'Wasting Their Time'

BOSTON — Sci-Tek Associates, Inc. has bid on a Massachusetts merit rating board contract despite a pronouncement from the governor that the company should not be involved in any state business.

Gov. Michael S. Dukakis made the statement after an Attorney General's investigation cited Sci-Tek for improper behavior concerning a conflict of interest in a recent state contract award.

"I'm surprised to learn [Sci-Tek] submitted a bid," Dukakis said.

Sci-Tek, which had been working under a no-bid contract for the Merit Rating Board, was scheduled to complete that contract Oct. 1. Bidding for the new contract is currently in progress and a contract decision is scheduled to be made Dec. 12.

Although Sci-Tek cannot be prohibited from bidding on any state contract, it would be "unfortunate if [the company] continued with that contract," Dukakis stated.

The governor has no direct influence on the contract selection board since it acts independently, but Dukakis hopes the board will take into consideration the Attorney General's findings, according to Alan Raymond, press secretary.

"They [Sci-Tek] aren't going to get it, they're wasting their time," Dukakis is reported to have said when he heard of Sci-Tek's bid.

Programmers 'Marginal'

(Continued from Page 1)

and job functions he found related to programming, Kraft determined that "some software workers are primarily engineers, while others are high-powered clericals."

It is the engineering efforts of some of these software workers — rearranging and redesigning work tasks and simplifying them so they can be done by less skilled workers or by machines — that has provided management with the means of "de-skilling" the average programmer's occupation, he said.

Structured programming has become just such a tool in the hands of today's management, Kraft said, even though theoreticians such as Edsgar Dijkstra and David Gries "have stressed in their writing that they see in structured programming the possibility of enlarging, rather than diminishing, the skills, knowledge and understanding of the average programmer."

But managers have always been selective in what they use to further their own ends, "ends which are invariably informed [sic] by the desire to reduce costs and increase profits," the sociologist noted.

"Barely a generation after its inception, programming is no longer the complex work of creative and perhaps even eccentric people. Instead, divided and routinized, it has become mass-production work parcelled out to interchangeable detail workers," he said.

Restrictions Imposed

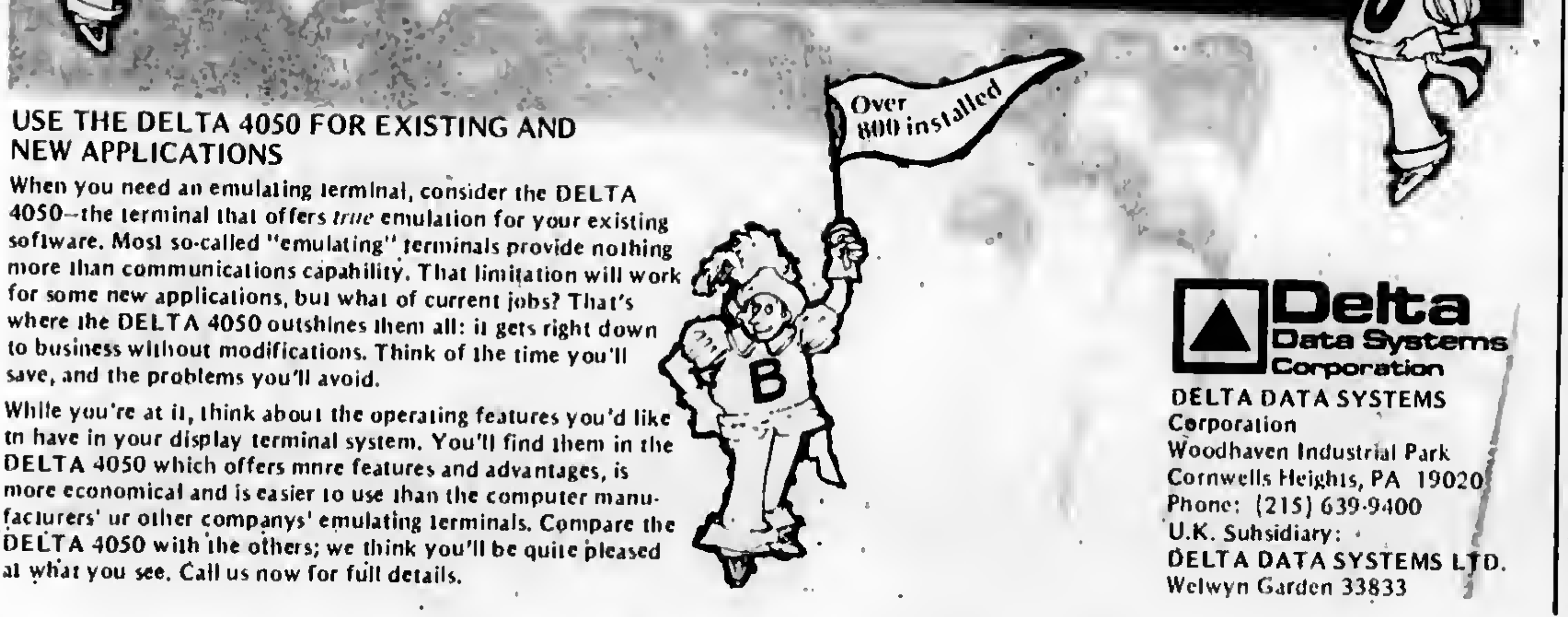
Structured programming methods impose restrictions on the number and type of logical procedures a programmer may use.

There is, he continued, a similar restriction, imposed by the "logic" of the structured programming technique being used, on the kind and quantity of information that may be called upon for calculation.

To aid in the production of a standardized product, structured programming as a way to structure work has been complemented by various social arrangements to structure the relationships between software workers, Kraft said, noting the most important of these "arrangements" are modulat programming and chief programmer teams.

The chief programmer team divides the "conceptual architectect" and his assistants from the people who actually write the code; modular programming "carries the process a step further" and establishes divisions between the detail workers themselves, he asserted.

Kraft's 118-page soft-cover book is part of the Heidelberg Science Library, costs $6.90 and can be ordered from publisher Springer-Verlag, 175 Fifth Ave., New York, N.Y. 10010.



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720 Crews Clocked

Backup Systems Prove Worth During Regatta

By Molly Upton
CW Staff

CAMBRIDGE, Mass. — How much timing backup is necessary for a regatta in which 720 entries are rowing against the clock?

The 13th Annual Head-of-the-Charles Regatta had terminals logged onto two Digital Equipment Corp. Decsystem-10s, with another one standing by, and about six people armed with digital readout stopwatches.

By the end of the regatta, which lasted six and a half hours and provided competition for more than 3,000 oarsman and oarswomen ranging in age from 17 to 77, two of the CPUs had been pressed into action and the stopwatches had proven their value.

To time the contestants, an operator at the starting line used an on-line terminal to key in the appropriate bow number and starting time of each boat.

A similar entry was made at the finish three miles upstream on the Charles River, where terminals were housed in a trailer hauled in for the regatta. Stopwatch times were also recorded at the start and finish.

At ADP First Data Corp., in Waltham, Mass., a Decsystem-10 subtracted the start time from the finish time and ranked the boats in their order of finish, indicating their times to a tenth of a second. The system also calculated handicaps, based on age, for the "veterans" race.

The crews started about 10 seconds apart, so there was little way for contestants or spectators to know who among the 40 entrants in each of the 18 races had emerged victorious.

This year, the backup systems proved not only prudent but necessary. During the 16th event, the starting terminal disconnected, according to regatta director Lawrence Copley.

A series of human errors ensued, such as the reopening of the file on event 15, which delayed the reporting of results in events 15 through 17. Normally the regatta is able to issue unofficial results about 10 minutes after an event is over.

While dealing with the problem of where to find the data from event 16, the starting terminal operator switched over to the second system at ADP First Data for events 17 and 18, Copley said.

But at the finish, times for event 17 were being logged on the first system.

Because of the problems, some times were lost in the system, but they were recorded on the terminals' logs, Copley said.

After comparing stopwatch times with the times recorded on the terminal printouts and those stored in the system, the timing committee then entered the appropriate times into one system, which calculated the results.

Postrace Adjustments

Despite the hassle, the regatta managed to award first-place prizes while crews were attending the postregatta reception. Prior to determining official results, judges' observations of course violations and decisions on protests had to be keyed into the system, which then issued new rankings.

After examining the course of events, the regatta directors concluded the software does not display enough status information and/or recovery instructions for use by people unfamiliar with the software structure.

But the software, written by Cambridge Boat Club treasurer Chuck Roth, does anticipate a lot of problems and helps avoid them, Copley said.

Modem Handles Three Data Sets

(Continued from Page 1)

The VA3467 is being registered with the Federal Communications Commission for connection to dial-up lines using the plug-and-jack arrangement approved under Part 68 of the commission's regulations. The unit also accommodates Bell Data Access Arrangement (DAA) configurations, Vadic said.

According to the company, the VA3467 "satisfies every answer mode application for switched network data transmission in asynchronous data format at rates from 0- to 1,200 bit/-sec." Users can install modems without modifying software or establishing new connect procedures for remote terminals, the spokesman said.

The modem utilizes an Intel 8035 microprocessor and includes continuous self-test, analog loopback/busy out, digital loopback and transmit reversal capabilities.

The modem comes in four versions. The VA3467 supports VA3400, 212 and 103 operation; the VA3427 combines VA3400 with 212; the VA3437 supports VA3400 and 103; and the VA3447 communicates only with the VA3400.

The VA3400 capability costs $650, the 103 adds $50 and the 212 is priced at $150. A three-modem capability costs $850.

First deliveries are scheduled for January. Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

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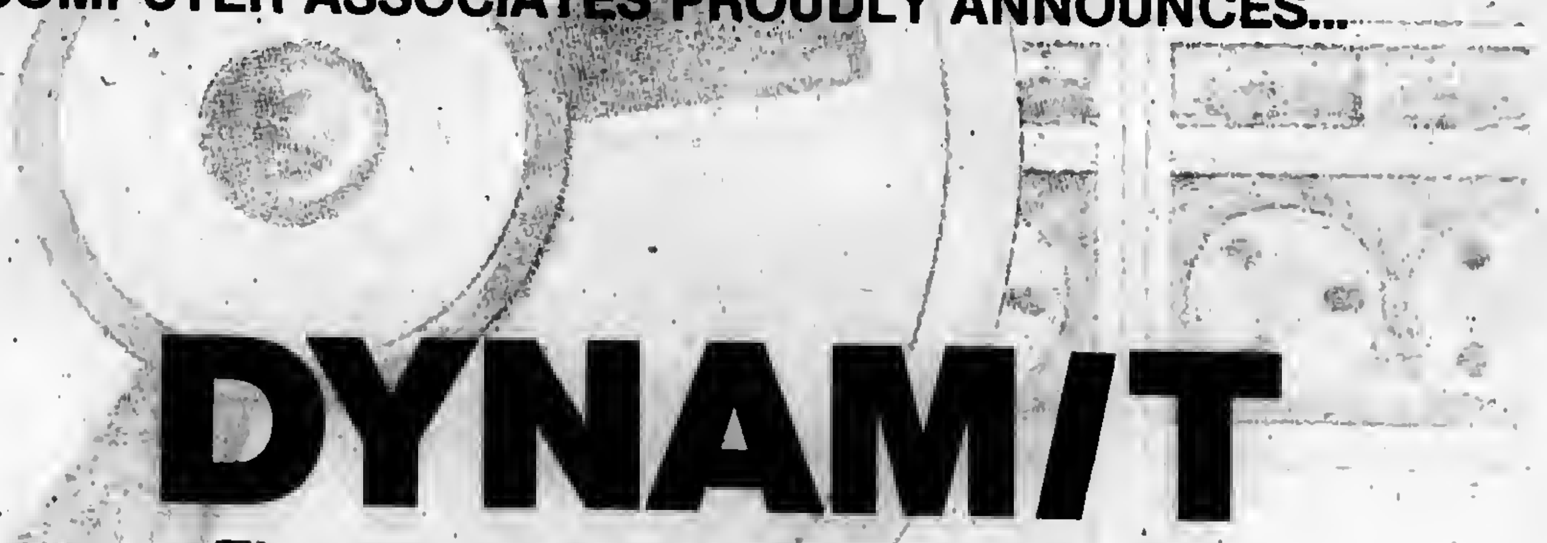

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Memo: IBM 'Almost Unchallenged Monopoly'

(Continued from Page 1)

man stated.

In the area of competition with leasing companies, the government has charged that in the late 1960s IBM considered unbundling services and instituting a "subsequent user policy" as a method of stopping the encroachment of leasing companies in the industry. One of the newly introduced memos seems to bear out this contention.

Although "any IBM executive who suggests that our DP service contract price should be even partially unbundled is likely to be regarded by his associates as a man in need of a vacation," such a policy was urged by Hilary Faw, assistant treasurer for IBM, in an August 1968 memo.

By then the Department of Justice had begun investigating IBM on antitrust grounds, and "legal opinion from both outside and inside counsel could suggest that the IBM pricing practice of a single charge for the combination of services could be regarded as a tie-in sale under the Clayton Act," Faw warned.

"A self-imposed unbundling internally designed and implemented by IBM" would be more desirable than any remedies resulting from a lawsuit, partially because it could be designed to slow down the inroads leasing companies had already made on IBM's installed base, Faw said.

Unless IBM realized "that leasing companies have already made it impossible to do business as usual in the future," Faw said, "we will be predisposed to a step-by-step retreat in the face of increasing demands by leasing companies to committing more and more free support services to subsequent users.

"If this step-by-step erosion is permitted to occur, we may find it legally impossible at some later time to impose a price for these services."

An unbundling announcement had to be timed right, he cautioned. Financial difficulties for leasing companies were expected to become "commonplace in the next two years. The threat of an antitrust violation stemming from the bundling superimposed on the possibility of numerous leasing company failures poses a treble damage exposure of unbelievable magnitude," Faw said.

IBM began unbundling user services in 1969.

The firm also began in the 1968-69 timeframe to change its policies toward leasing firms as opposed to other IBM users by refusing to provide services for other than the first user of a system. This policy was invoked to hurt the leasing companies, the government charged after studying another internal IBM memo.

That document is a draft for presentation to a Management Review Committee meeting on Nov. 27, 1968. It suggested dropping the practice of treating first users and subsequent users the same and recommended using "as rationale that administration of old policy [is] becoming increasingly difficult to apply in an equitable manner, or something to that effect."

The suggestion was evidently made in response to the threat of a lawsuit by DPF&G, a leasing firm, over the way the old policy had been administered.

"Say nothing to [Harvey] Goodman [of DPF&G] — but get this out before he has a chance to file his complaint," the memo said. "Take away Goodman's principle source of complaint" and "halt accumulation of damages to leasing companies.

This would cause "our move to come before [the] Goodman suit when and if he files. [The] public will not *know* our move was related to the suit, and we can avoid comment that we are merely reacting to outside pressure," it said.

"In retrospect (assuming we unbundle) [the] public will realize this was a strategic first move of [a] thoughtfully conceived plan.

"If Goodman does file, he is likely to be regarded as some kind of nut (he will be in the position of trying to enforce antitrust laws, violation of which are helpful to him and to other leasing companies)."

The authors of all these documents were highly placed corporate officials who were also members of IBM's executive staff, supporting an earlier claim by the government that "IBM's highest corporate officials recognized IBM's monopoly power ... and undertook ... to minimize the likelihood of detection and liability."

Senate Gets Trial EFT Bill

(Continued from Page 1)

provide the necessary catalyst to an understanding of how best to serve the banking needs of the American public in the 1980s and beyond."

McIntyre, who chairs the Senate Banking Subcommittee on Financial Institutions, stressed the need "to modernize our banking laws with regard to the geographic placement of banking services.

"At the very least," he told the Senate, "financial institutions must be permitted to service their customers through electronic means ... where they live, work and shop."

In addition to overriding the traditional bank branching laws embodied in the 1927 McFadden Act, McIntyre's bill addresses such issues as consumer privacy, EFT facilities that are shared by financial institutions and the role of government in EFT.

The Subcommittee on Financial Institutions will hold hearings on the proposed legislation early next year.

No Artificial Barriers

The Bill S. 2293, expresses the EFT commission's finding that consumers will benefit from the extension of EFT systems through competition among financial institutions and other business enterprises. Neither geography nor government regulation should be allowed to create artificial barriers to EFT growth, the bill said.

McIntyre proposed that all federal financial institutions — national banks, federal savings and loan associations and federal credit unions — be permitted to establish or use EFT systems in the U.S. and abroad.

In general, the bill would not permit these federal organizations to offer deposit services through EFT systems outside their home states. It does, however, provide for two exceptions to this rule: out-of-state deposit services may be made available when state laws permit it or when an institution's "natural market area" extends beyond the state's boundaries.

The bill specifically authorizes a financial institution that owns or operates an EFT system to make it available for use by other financial institutions, retailers or other businesses through franchise, lease or corresponding arrangements.

The proposed legislation reaffirms tht the antitrust laws will apply to EFT services to ensure the development of competitive systems. State mandatory sharing statutes are particularly preempted by the federal bill on the ground that they "will tend to thwart the formation of rival networks in those states."

Under McIntyre's bill, federal, state and local governments would be prohibited from accessing a customers' financial records unless the government had the customer's consent, a reporting requirement legally authorized access or a subpoena or warrant for the records had been issued.

The Federal Reserve System's Board of Governors would write all disclosure regulations for financial institutions offering EFT services to their customers.

Finally, the proposed legislation would press automated clearinghouses (ACH) to allow thrift institutions to use their ACH services. Federal Reserve bank services would be withheld from an ACH if the ACH were not open to all financial institutions.

In addition, with the exception of the services they provide to ACHs, Federal Reserve banks and federal home loan banks would not be permitted to enter into the EFT business.

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Opens Competitive Bidding

County Revokes OK of Sole-Source IBM Order

By Jeffry Beeler
CW Staff

BAKERSFIELD, Calif. — Nearly three months after approving the sole-source procurement of an IBM computer system, the Kern County Board of Supervisors here has admitted it erred and has agreed to let other vendors bid for the contract.

"We in government are human just like everybody else, and sometimes we make mistakes," Supervisor John Mitchell conceded, referring to the board's initial endorsement of the sole-source procurement.

The council's Oct. 18 decision to rescind a long-standing purchase order for an IBM 370/158 system marked an abrupt reversal in the five-man board's attitude toward competitive bidding.

Ever since it had approved the acquisition of the 370/158 during a budget hearing last July, the group had strenuously resisted suggestions from IBM rivals that it open the county's contract to competitive bidding.

Echoing the sentiments of Kern County DP director John Veon and his staff, board members had maintained that requesting and evaluating bids from rival mainframe vendors would seriously delay the acquisition of a much-needed supplement to the county's existing IBM 360/40. They also had insisted that installing a non-IBM computer system would create serious training and software conversion problems.

Opposition Crumbled

In early October, however, the board's opposition to competitive bidding suddenly crumbled when T.H, Busby of Univac's Southern California Public Sector wrote the group a letter informing it of the IBM 3031's availability and adding that "if the county had waited one month, it would have been able to procure a new machine [and] would have saved at least 37% on the purchase price."

Busby's letter reached the supervisors nearly a week before Veon's office issued a similar warning, and its contents earned the DP department a sharp rebuke from the board members. "We were very concerned that someone outside the county government could notify us of a potentially cost-saving alternative to the IBM 370 before our own data processing department did," Mitchell explained.

That concern, however, apparently has not shaken the board's confidence in the DP department's competence or integrity. In fact, when it scrapped the original purchase order for the 370/158, the board immediately appointed Veon and his staff to write specifications for an alternative computer system.

Mitchell and his colleagues expect to see the results of the department's work by the end of the month and then send bid requests to several as yet unspecified computer vendors.

Local Univac representatives Len Vinson and Phil Mitchell, on the other hand, charge that Veon and his staff deliberately misled the board about the technical capabilities of non-IBM computer equipment. "They (the board of supervisors) were supplied with totally inaccurate product information," Phil Mitchell complained.

Both Univac representatives also accuse Veon and his colleagues of being biased in favor of IBM, and Vinson has expressed fears that the DP department's upcoming product specifications will reflect that alleged prejudice.

John Mitchell dismissed those fears as unfounded and added that he "had no reason to believe" that Veon and his staff had ever intentionally fed the board faulty technical information about IBM's or any other company's computer systems.

The controversy surrounding the DP department's alleged deception and vendor bias has helped fuel a continuing and often bitter contract struggle between Kern County officials and several IBM competitors, notably Univac.

That struggle has revolved around vendor efforts, until recently unsuccessful, to force the Board of Supervisors to consider alternatives to the 370/158.

The roots of dispute here can be traced back to an April board meeting when Veon first advised the supervisors to opt for a sole-source procurement. In a detailed memo outlining his position, Veon argued that his department's growing DP workload had forced the county to acquire an additional computer system as soon as possible and that competitive bidding would seriously delay the installation.

Univac's representatives, however, were less than enthusiastic about Veon's proposal. Although neither Vinson nor Phil Mitchell disputed the legality of Veon's recommendation — in Kern County, as elsewhere in California, computer systems qualify as personal property and thus are exempt from the competitive bidding requirement — both men questioned the reasoning behind the decision.

They also insisted that Univac could offer the county a single 90/80 or a dual 90/60 with the same capabilities as the 370/158 but for $1.7 million less.

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Hammer: DP Creating, Also Easing Complexity

By Esther Surden
CW Staff

SEATTLE — Although society becomes more complex daily, technology is continuing to develop the tools to deal with that complexity, Dr. Carl Hammer, director of computer science at Univac, told a recent conference here.

Computers — which may be part of the complexity problem — can also be a part of the solution, Hammer said. Each step in the explosion of information has been accompanied by a development in computer processing to cope with the problem, he explained.

"Several areas in this electronic technology race have clearly emerged to warrant our admiration — and concern," Hammer said.

The first of these areas is computational speed, and its history can be illustrated by looking at the history of the symbol "pi."

The Babylonians computed pi to two decimals; in 1596 it was computed to 35 decimals. Now pi has been computed 100,000 decimal places using an IBM 7090, he said.

Another area of advancement has come in reading and processing information. This can be illustrated by comparing the amount of information a person can read and digest, even after taking a speed reading course, with the amount of information a computer can digest.

But those speedreaders who can read up to 1 page/sec are "still pikers," Hammer said, since current DP speeds exceed the equivalent of 1,000 page/sec, even for the average system.

Storage and Retrieval

Great advances have also been made in the areas of data storage and retreival, Hammer pointed out. DP systems can "remember millions of names. Not only have we greatly increased our ability to store such large data volumes, we have also made it easier to retrieve them."

This ease of retrieval has created concerns over protection of privacy which have lead to regulation and legislation, he said.

A fourth area of admiration is the ability of electronic systems to perform complicated algorithms "effortlessly," Hammer said. Man is not even in the contest when it comes to computing these formulas, he indicated.

Communications is another aspect of data processing that has been unquestionably speeded up by computers, according to Hammer. When Christopher Columbus discovered America, he didn't know where he was or by what miracle he got there, he said, and it also took a long time for the world to understand that North America was not India, but a previously undiscovered continent.

In contrast, when man landed on the moon, he knew exactly where he had landed, how he got there, when he would return home — and with electronic communications, everyone else knew, too, Hammer noted.

Finally, "we must recognize the superior ability of electronic systems to respond to interrupts. Computers can respond to interrupts on the milli-, micro- and now even nanosecond level. In contrast, the most a human could respond to is about two interrupts per second."

All of these developments have been "catalytic" because of their size. "The electronic age is also the age of gigantics," Hammer stated. All problems come in large sizes, and the magnitude of the problems is staggering, he added.

Although computer systems are an integral part of the problem, the technological progress made so far has been contigent upon the availability of computer power, he pointed out.

"I don't take the view that electronic systems are a panacea" for these problems, Hammer said, but noted that despite all the problems we are surviving . . . We haven't really bogged down."

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Hammer Urges DPers to Meet National Needs

By Esther Surden
CW Staff

SEATTLE — The computer industry needs to explore the areas of computer science that will make the greatest contribution to the national need, Carl Hammer, director of computer science at Univac said at a recent conference here.

Effort should be invested in making data base management systems more functional, making man-machine interfaces more natural and developing better languages and better ways of producing programs, Hammer said.

The storage, maintenance and retrieval of data and information are "key" to efficient operations in society, making the management of the data increasingly important, he pointed out.

For that reason, the industry must push beyond the already existing relational data base system to include the concepts of fuzzy sets and associative processors, he said.

In the realm of hardware and interfacing, Hammer advised the industry to more beyond the present methods of interfacing with a system. Presently man interfaces with the computer visually via a CRT or tactilely via a keyboard.

The third channel for interfacing — the audio channel — is not used, he noted. Voice recognition and natural language translation and processing methods should be developed, he urged.

(Continued on Page 9)

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Antifraud Plan Meets Opposition

Mass. Welfare Wants to Tap Private Bank Files

By Ann Dooley
CW Staff

BOSTON — The Massachusetts Welfare Department has proposed a computerized system for matching names and addresses of welfare recipients with bank savings accounts records in an effort to crack down on welfare cheating.

Under federal and state regulations, most people with bank accounts would not be eligible for welfare.

The department's "saving" efforts are being thwarted, however, by the State Banking Commission, which so far has refused to cooperate on grounds that the system would be a potential threat to the privacy of all bank customers.

As proposed, the system would give the department access to all bank records.

The Banking Commission has no power to stop the Welfare Department from examining welfare recipients' records, since under Massachusetts law, the depatment can do so with the voluntary cooperation of the individual bank involved according to Deputy Commissioner of Banks Edward Flynn.

Officials of the two agencies have met to work out differences, but to date those meeting have been largely shouting matches, Flynn said.

He claims the Welfare Department is not concerned with privacy but only wants the cooperation of the banking industry so it can carry out its matching system.

Sumner Hoisington, deputy commissioner of welfare, admitted that getting the banking industry cooperation will be a "major effort" since it is a decentralized system and that the Banking Commissioner's help would be important to the success of the project.

But the Welfare Department also believes it is important to protect people's privacy and security, he continued. The department follows the guidelines of all current state and federal privacy laws, he said.

Flynn contends that the major problem is that even though the department says it is only interested in welfare records, it would have access to everyone's records, nonetheless. The Welfare people don't seem to realize the far-reaching effects unlimited access to those records could have, he added.

A file management system similar to the one that will be used for the bank accounts has been used by the Welfare Department to cross-check Administration and Finance personnel files, Social Security files and Division of Employment Security files and match them with welfare files, Hoisington said. No one has ever complained about the use of files in that system, he said, adding that when the program was first implemented, task forces were set up to study the privacy questions.

Matching is based on a name-address formula rather than the Social Security number, a spokesman said.

When a "hit" occurs, humans take over to analyze whether a discrepancy is actually illegal, he said.

Previously, the DP work was done by Urban Data Systems, but the Welfare Department has proposed handling the computerized bank record system itself, according to Steve Kane, assistant commissioner for assistance payments. It will give the department more flexibility and more immediate retrieval of data, he said.

It is estimated that 2% of the 116,000 Aid for Dependent Children (AFDC) recipients are ineligible because they have savings accounts larger than limits set by the state, Hoisington said.

That amounts to illegal claims of $7 million to $8 million per year, he said, commenting "we could use that $8 million very nicely somewhere else."

The meetings between the two agencies are scheduled to continue, although neither side seems optimistic about resolving their differences, according to Flynn.

Hammer Urges National Efforts

(Continued from Page 8)

"We do not yet communicate in a natural language with a computer, not withstanding the Cobolphiles who say Cobol is like English. I say it is as bad as my German accent," he contended.

Software is another area of concern to Hammer, who said the industry needs better and more systematic ways to produce it. Although structured programming methods have gone far toward improving software results, automated methods are needed to make software capable of holding up under internal and external operational and data errors.

According to Hammer, following up on these needed areas of development, computer scientists can best serve the needs of the nation by producing solutions to at least parts of the nation's problems.

Hammer hopes computer professionals will be thought of by future generations as people who gave "meaning and hope to the lives of millions who now live in disease, Ignorance and poverty."

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Farmer's Almanac Predicts Hard Winter Ahead

By Ann Dooley
CW Staff

DUBLIN, N.H. — What do a computer and a nail in the privy wall have in common?

The Old Farmer's Almanac, that's what.

The almanac uses computer calculations to help forecast the short- and long-term weather around the nation; despite such a modern innovation, however, it still has a hole in the corner so it can be hung on the privy nail.

A computer has been used for the almanac's weather forecasting for about the last 12 years, but that's a relatively recent development for the 186-year-old publication.

Every year the almanac predicts in rhyme the seasonal and daily changes for every part of the country, according to editor Judson Hale.

Although Hale wants to keep the almanac's method of weather prediction a secret, he indicated that data on sunspots, the electromagnetic field of the sun and the field's relationship to the earth's atmosphere as well as other variables are entered into Dartmouth University's time-sharing computer.

The system performs mathematical calculations and then Hale and two other almanac staff members make their predictions based on the numbers.

The daily forecasts tend to be less accurate than the seasonal forecasts, Hale admitted, but the overall forecasting is getting better all the time. The seasonal forecasts have an overall accuracy rate of about 80%, he said.

If the 1978 almanac and the computer equations prove accurate, the country could endure a winter similar to that experienced at Valley Forge 200 years ago. The weather will be colder than last year — continuously for the Northeast and intermittently as far west as the Great Plains.

The rest of the country will escape some of the cold, but Florida will freeze in December, according to the predictions.

Europeans Financing Study On Transborder Data Flow

LONDON — Six West European countries have hired a firm experienced in design and implementation of computerized data networks to undertake an empirical study of the socioeconomic impact of computerized data traffic across national boundaries.

West Germany, France, the Netherlands, Norway, Sweden and Spain are sharing equally in the financing of this study of transborder networks in West Europe, which will be performed by Logica, Ltd. here.

Logica designed and implemented the European Informatics Network (EIN) and the Dutch Communications Network (CNET).

The project supplements current efforts of the Organization for Economic Cooperation and Development (OECD), which is comprised of 15 West European nations.

An OECD symposium last month in Vienna addressed to various issues of international data flow concluded that information on existing application methodologies and on the nature of data being transmitted are crucial to an understanding of this activity.

Attempting to compile such information, the Logica project will examine four types of networks: public networks, community or shared networks, service bureau networks and selected networks of private international companies.

The project is especially concerned with privacy of personal data, such as credit information. It is expected to be completed in December.

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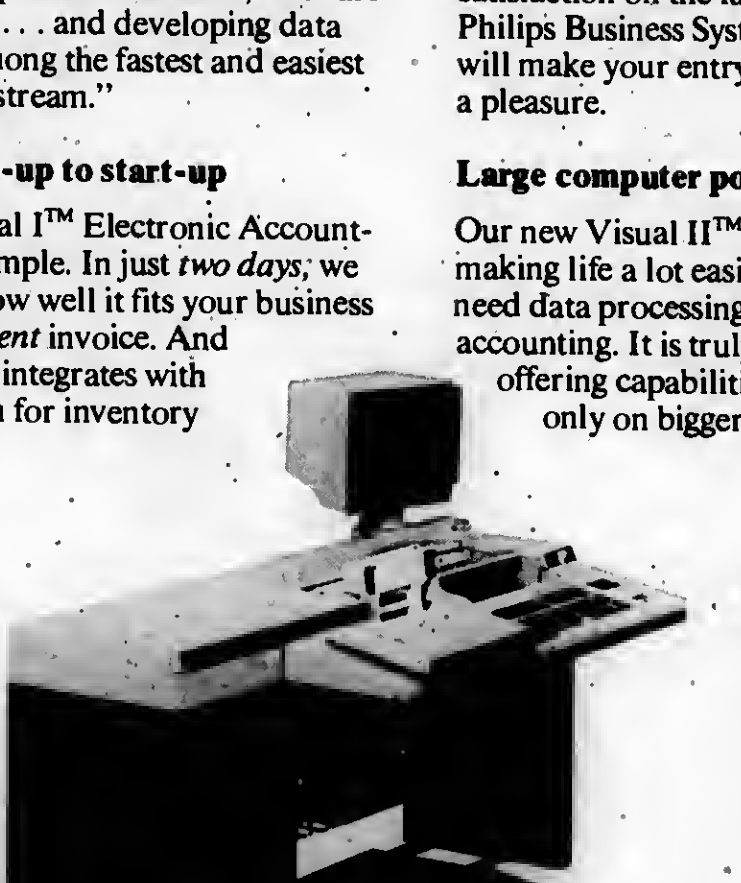

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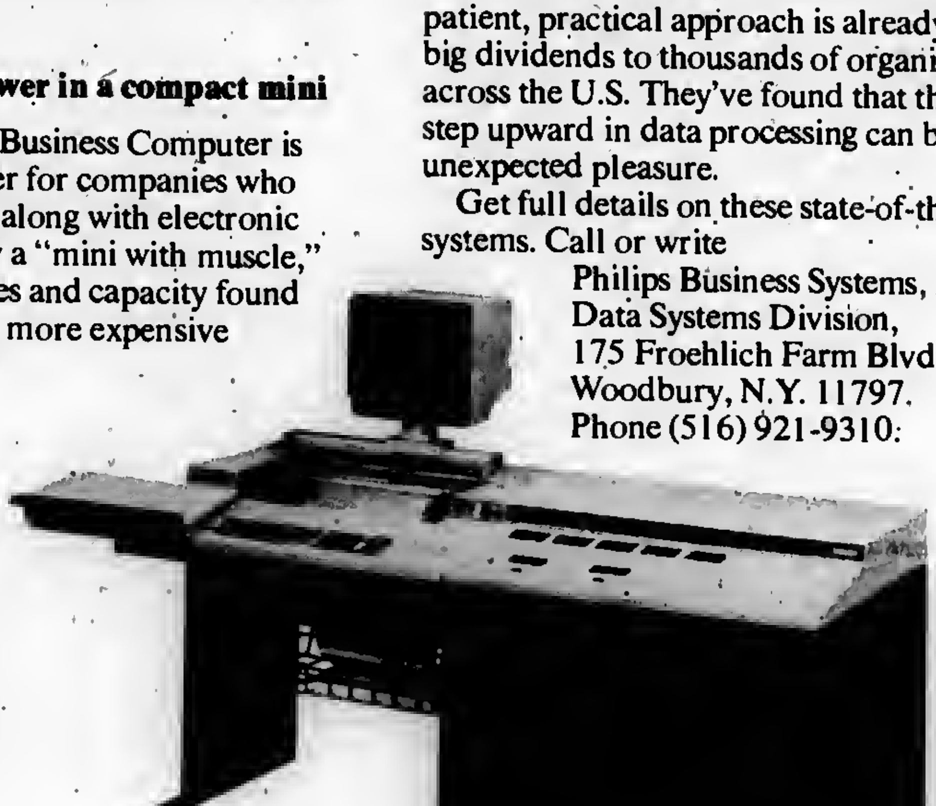

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Students Answer, Evaluate Questions

System Changing Earlham Education Process

By Tim Scannell
CW Staff

RICHMOND, Ind. — Earlham College here is developing a computer-based conferencing system here that may make a new kind of learning possible.

Rather than serving as a calculator or tutorial machine, the system performs more like a telephone that students use to answer, question and evaluate and comment on essay examinations, according to Dr. Jerome Woolpy, coordinator of the project.

Based on a Digital Equipment Corp. PDP-11/70, the system is expected to improve communications between students and professors as well as among the students themselves, Woolpy explained.

The system is presently installed on a pilot basis. A typical student, during the course of a 10-week semester, is assigned a code number known only to him and the instructor.

When chapters are assigned to be read or a lecture is given, that student is not tested by the conventional paper-and-pencil methods, but rather through one of 10 terminals.

After keying in, the student selects a category from the assigned reading. He can then either ask a question, answer a question already submitted by another student or offer a comment.

His input on the terminal is restricted to 200 words and a text editor is available for final corrections.

If the student chooses to answer a question, he has the option of rejecting those he feels are not suitable. Since grades are based not only on the evaluation of answers but also on the significance of questions, a student must become a good "teacher," Woolpy said. This prompts him to consider the subject matter differently.

In a comment, a student assigns a point value from 1 to 10 to the input from other students. Comments, are, however, not included in grade evaluation.

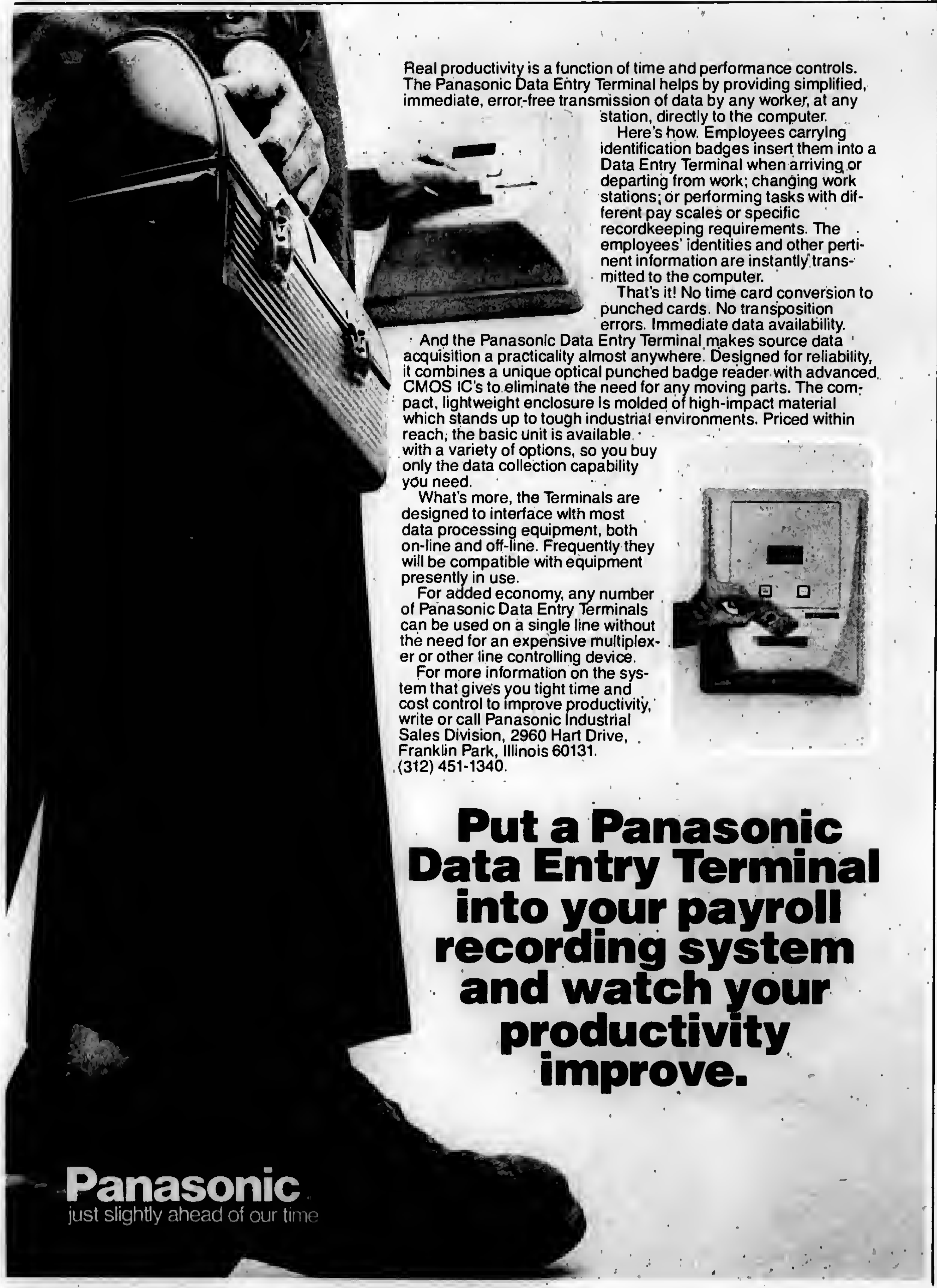
Whatever is entered through a terminal is available to all students for consideration and eventual feedback; the terminals have a reported retrieval time of 1 second.

Anonymity Promotes Honesty

Woolpy believes the system can prove to be an invaluable aid. Not only does it give the student a larger role in his own education, but it gives the instructor a clearer view of his class because he can track an individual's progress.

The anonymity involved, he added, also promotes a more relaxed and honest atmosphere.

The project, funded by a $124,000 grant from the National Science Foundation, will continue for 24 months.



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DP's Status Seen Block to Data Base Success

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. – If you plan to implement a data base, be forewarned. The chances of succeeding in your enterprise are not very good, Barbara Fossum said at a recent conference here.

In a two-hour technical session entitled "Data Administration," the Univac data processing consultant explained that the prospects of creating a successful data base might be better if DP departments occupied a higher place in the corporate hierarchy.

At most firms, however, DP managers exercise much responsibility but little authority. As a result, they lack a strong voice in shaping data base administration policy, she said.

Fossum criticized the common practice of administering data bases at the staff level. The people who are appointed data base managers are often technical types who are ill-equipped in temperament and training to deal with the human relations problems they soon encounter in their new positions.

More importantly, though, data base managers are often held accountable for administrative matters over which they have little direct control, Fossum added.

Committee Approach

A more effective way of administering a data base is to create a committee composed of a technical manager and a board of high-ranking corporate executives, she recommended. In most instances, these executives should be the heads of the major corporate departments such as marketing, finance and manufacturing.

In theory, this management-by-committee approach places the power to formulate data base policy squarely in the hands of the departments that will use the base. In practice, however, the technique works only when the committee members are given the authority to make and enforce decisions affecting their respective departments, she warned.

And even then, the approach sometimes fails, especially in large corporations, Fossum added.

Fossum outlined five steps that she recommended users follow to help ensure a successful data base installation.

First, one should educate oneself and all the managers who will be involved in creating and administering a data base, she said. Users should hire consultants and seek advice from competitive vendors who have been trying to gain a toehold in their DP shops. Users should tap the technical expertise within their departments.

She also advised users to talk with current data base users that are similar in size and function to their own companies, to listen to their experiences and to pay particular attention to any problems they may have encountered.

Second, users should prepare a detailed installation plan and should try to predict what could go wrong. If the department establishes a formal mechanism for solving problems and keeps a log of any installation difficulties it encounters superiors will be prepared if the data base fails, she explained.

Third, the manager must obtain a commitment from all the personnel who will be implementing, using and administering the data base, Fossum said.

Fourth, a position for a technical data base administrator must be created. Ideally, the person who occupies the slot should be "applications-oriented" and should interact well with users, she said.

Fifth, problems should be brought into the open and superiors should be kept informed of progress — or lack of it — at every step of the installation.

In creating a data base, objectives should include planning and implementing an overall information strategy, increasing data utility and — most difficult of all — cutting installation costs, she said.

Users of prospective data bases should also make sure their DP managers enjoy the same executive status as other corporate department heads, Fossum suggested. "DP managers often have a better feeling than anyone else for the structure and organization of their companies," she said.

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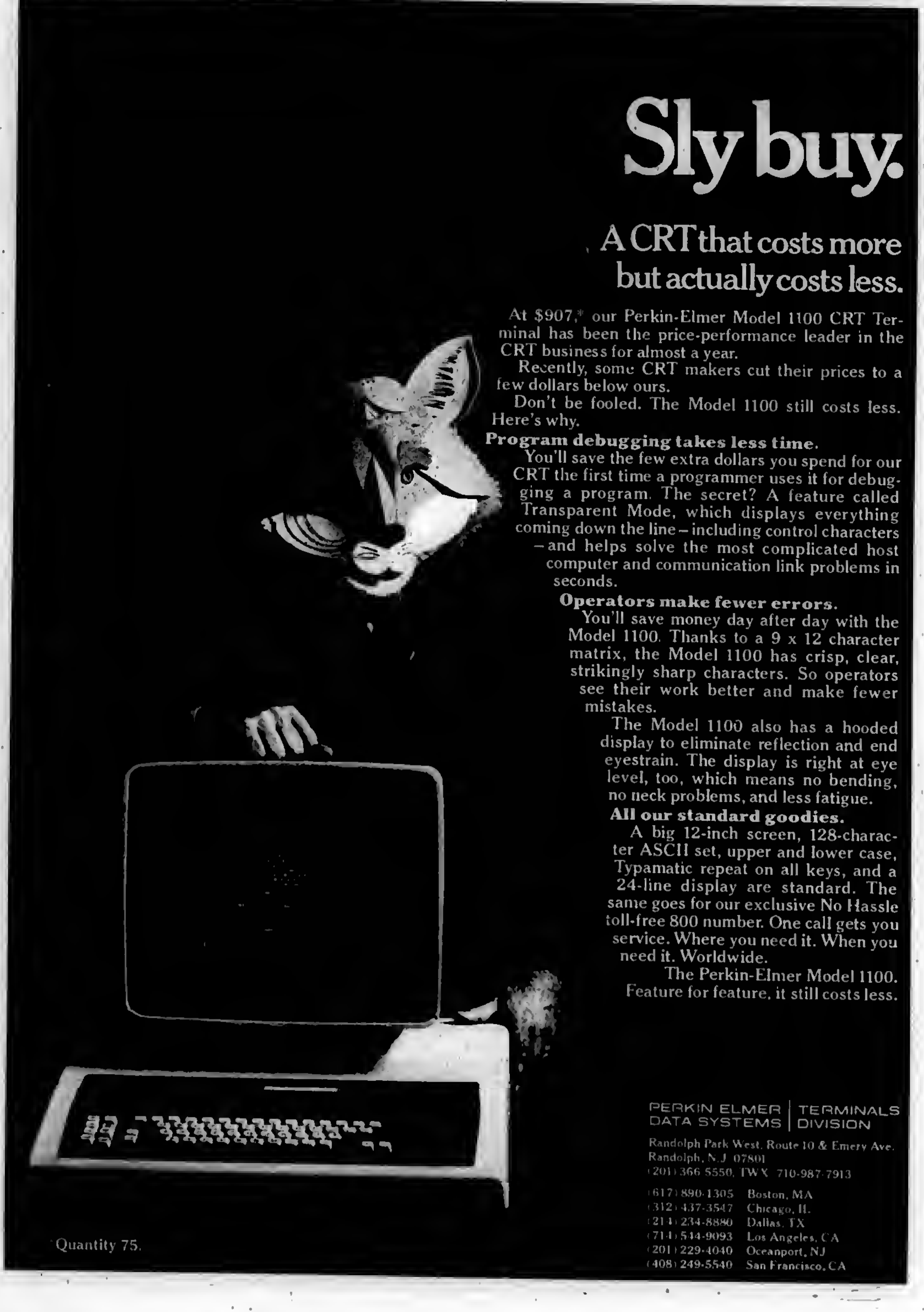

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Framingham inmate demonstrates how to change a circuit breaker on computer printer as Honeywell's Richard N. Henderson looks on.

Training Program for

By Tim Scannell
CW Staff

FRAMINGHAM, Mass. – A DP education program initiated by a vendor for inmates of the Massachusetts Correctional Institute (MCI) here marked its 10th anniversary recently.

The program, which teaches keypunching, computer operations, programming and maintenance, offers "hands-on" experience to prison residents through the use of a Honeywell Information Systems, Inc. Series 200 computer. Between 1968 and 1972, inmates associated with the endeavor have provided more than $2 million in services to such state agencies as the Department of Education, the Department of Natural Resources and the Division of Corporations and Taxation.

The entire program began in 1967 when an inmate of the prison requested computer programming instruction after seeing related want ads in a newspaper. His request was referred to Malcolm D. Smith, then a manager at HIS' Programming Development Group, who agreed to set up a program at Walpole, a maximum security prison, in June of that year.

HIS donated books, supplies and computer time, which in the first year cost the company no more than $2,000. Instructors for the courses were volunteers who received no remuneration for their activities.

In 1973, the top programmers from MCI Walpole and MCI Norfolk, other prisons where similar courses had been started, were moved to MCI Framingham, a minimum security prison. HIS provided them with their own computer system.

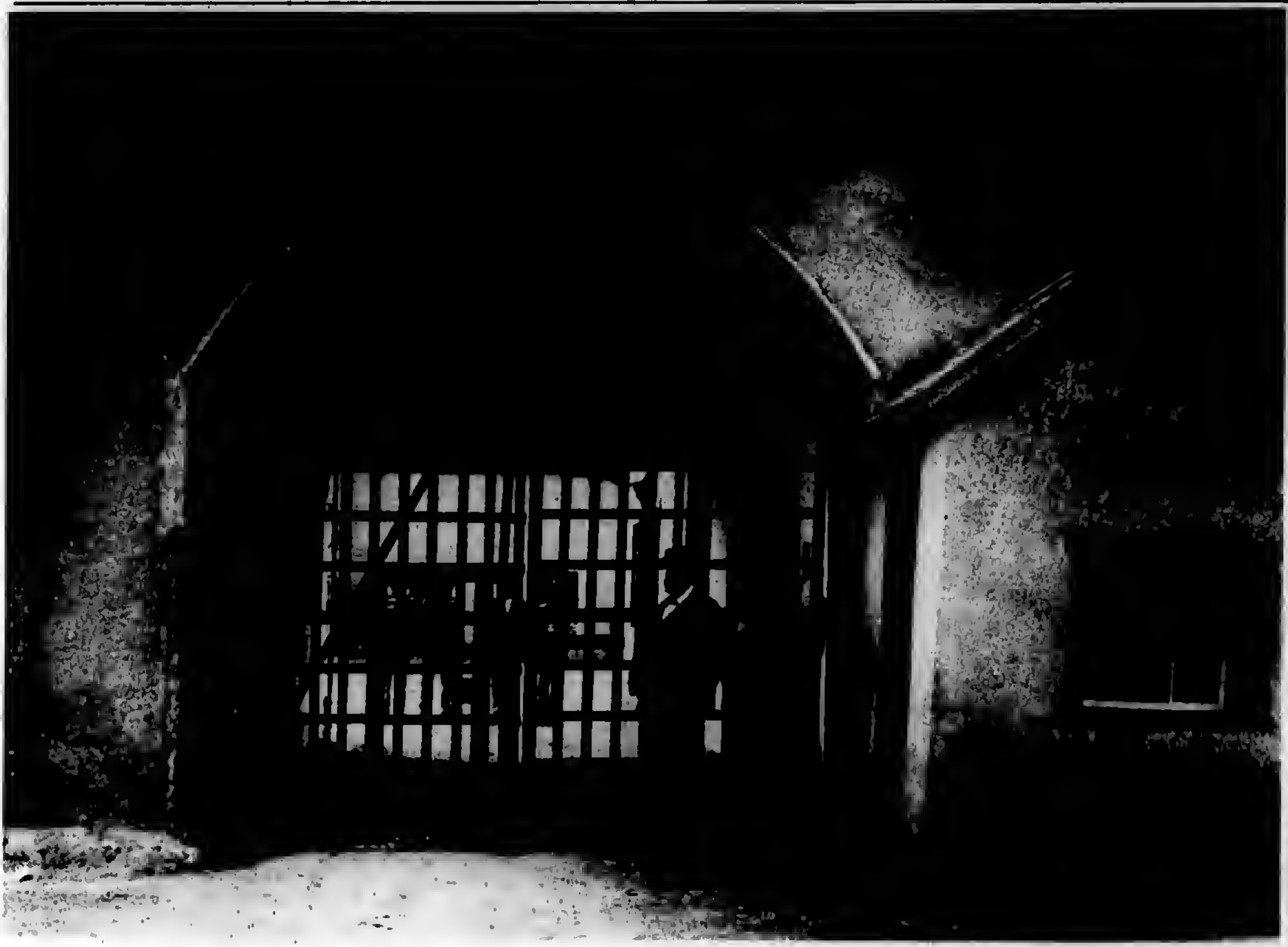
Despite the fact that the inmates cannot make sales calls on prospective customers, the senior programming group at Framingham has set up a service bureau business. Called Con'Puter Systems Programming, the business not only provides work experience and learning opportunities but, since the passage of a law in 1972, allows a prisoner to receive pay for the work he does.

One of the reasons the project is so successful, according to Smith, is that it is self-perpetuating. Two inmates are selected at the end of each class to give a small presentation at the next meeting.

Students are also required to teach new arrivals to the program and to prepare an instructor's manual at the end of their particular segment. These precautions were taken to assure the program would continue even if HIS instruction could not.

The program's dropout rate is fairly high. Of the 30 or 40 inmates that sign up for the program, only half are picked as qualified to continue on to more advanced skills.

The other half will eventually discontinue DP training, which consists of such basics as flowcharting and Cobol language introduction. Eight to 10, on the average, finally complete the course and dedicate themselves to the program on a full-time basis.



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Inmates 10 Years Old

Of the 650 or so inmates who have entered the program since its inception 10 years ago, nearly 400 have become proficient enough to get jobs as beginning programmers or computer operators, according to Richard N. Henderson, HIS' community services manager and current director of the program.

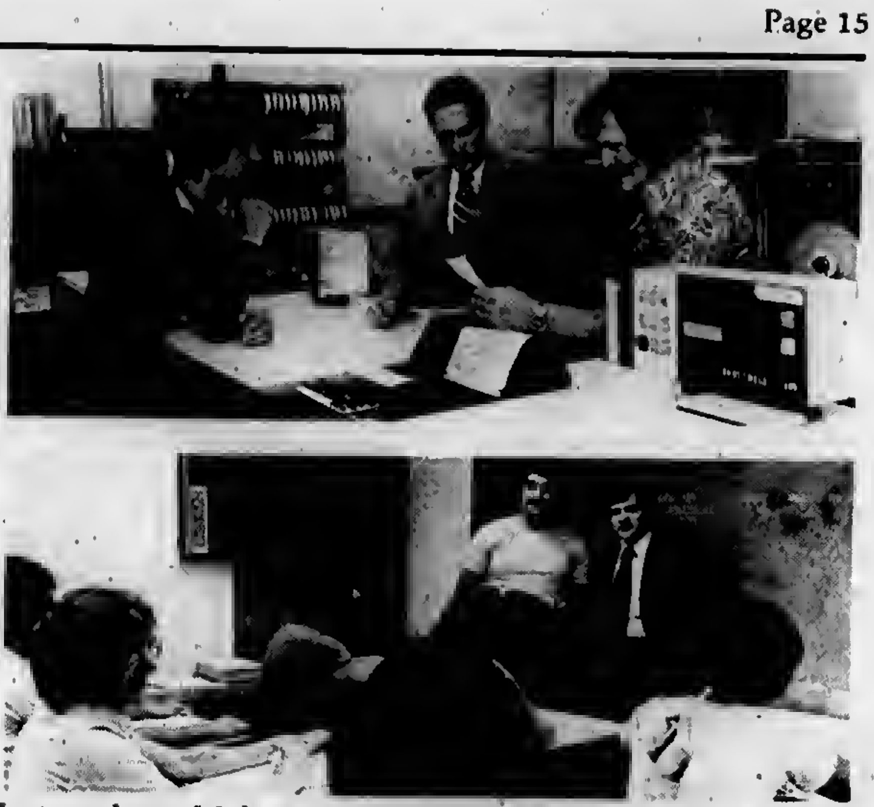
The 350 graduates who have been released from the institution not only have a number of professional successes, but a recidivism rate of 3% to 4% — a marked contrast to the estimated 70% nationally.

Henderson attributed the program's success to the "live" programming experience an inmate receives while in the program and the self-respect he has upon completion. Of course, he noted, some participants have obtained other types of employment upon leaving, but he feels their DP training was a factor in getting their first jobs.

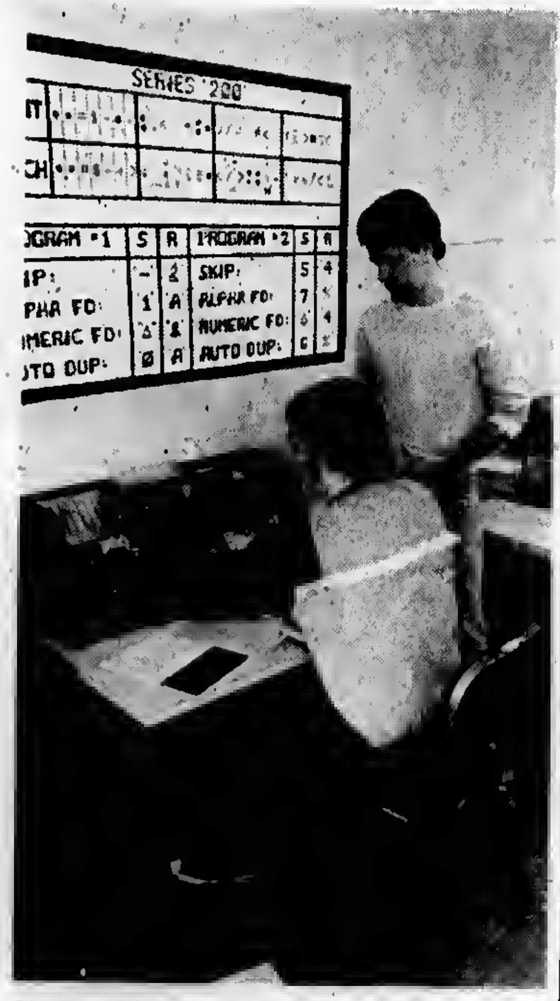
Profits from Con'Puter Systems Programming have fully paid for the computer facilities at Framingham. The inmates pay all of their overhead, which includes electricity, a business phone and office and computer supplies.

Clancy W. Spangle, HIS president, is optimistic about the program and satisfied with its results. At a recent press briefing here honoring the program's 10th anniversary, Spangle said he feels that each inmate involved with the DP training program is learning a skill and not just being taught.

An inmate, Spangle said, cannot be rehabilitated, but he can be afforded the opportunity to rehabilitate himself. It is his hope other industries will follow HIS' example and initiate work/training programs at similar institutions, Spangle said.



In top photo, Malcom D. Smith (center) discusses report with inmates George Magrath (left) and Richard W. Quillen. Below, inmate-instructor teaches programming.



Keypunch instruction is given to inmate by another who has already mastered the basic course.

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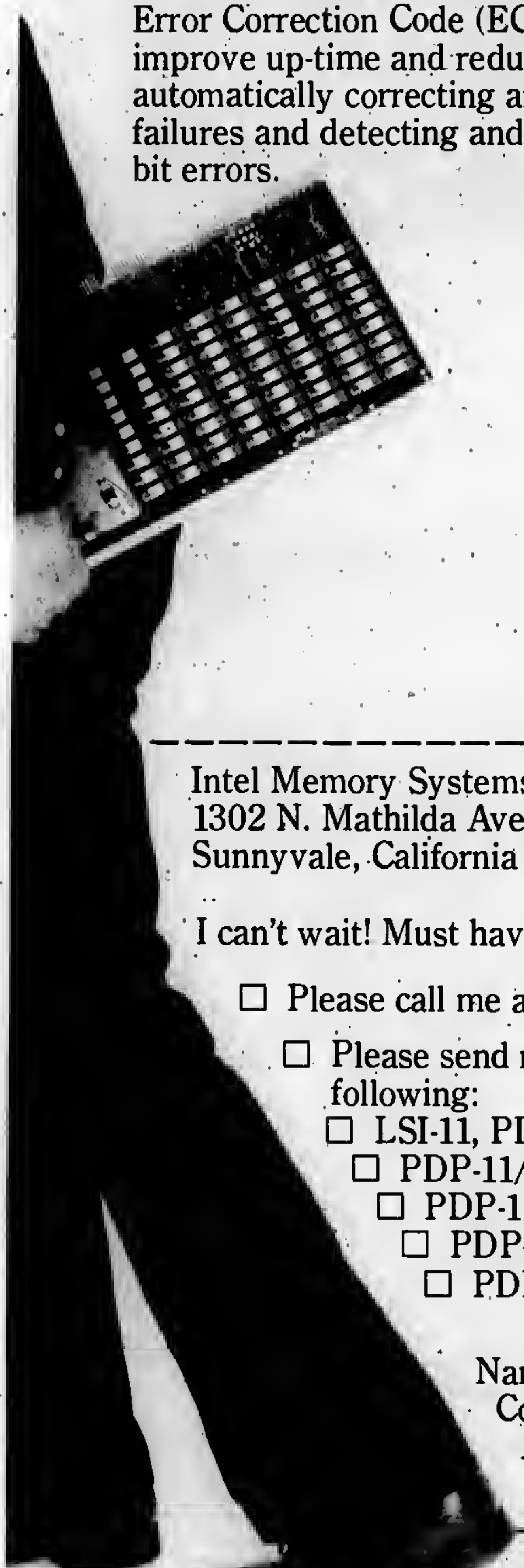

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Individual Order Seen Basic Unit In 'Logistical Information System'

By Ann Dooley
CW Staff

NEW YORK — To be effective, an information system must control data in a way that assures the right product will be in the right place at the right time, according to Donald Kruszenski of A.T. Kearney, Inc.

That function is the key ingredient, he said at a recent conference here.

"The whole operation, which I call a Logistical Information System, should begin with each individual order and continue on that basis," Kruszenski said. The order should be considered the ultimate profit/loss unit, he said.

An effective system should include order revenue, manufacturing cost, order gross margin, transaction costs, order processing, inventory carrying, outbound freight and commissions and any other specific criteria, Kruszenski said.

This kind of system should consist of a host processing node, an intelligent controller and operational data sets and application terminals that would be the focal point for user activities, he said.

As the system is implemented in a distributed data processing (DDP) environment, central controls decrease and user responsibility increases, he noted.

A logistical information system would provide product availability and inventory reliability, order cycle times dependability and accurate notation of specific packaging materials, Kruszenski said.

Benefits of the system would also include flexibility, post-sale support, pricing accuracy, invoicing on a complete basis, reduced order lead time, complete customer product information, faster credit reviews and increased cash flows, he said.

Implementation of a logistical information system in a DDP environment requires an integrated systems plan, education of management and selection of high-return area. During planning and implementation, results must be shown and goals reached one step at a time, Kruszenski advised.

Jerry Smith, senior manufacturing consultant to Rockwell International Corp., told the Info '77 audience about the actual conversion of Admiral Group, a division of Rockwell, to the type of system Kruszenski had described in theory.

The first step Smith undertook was to define Admiral's DP problems, which included a complex pricing structure, an inaccurate goods inventory, a manually oriented sales order processing system, high distribution costs, unrecorded sales and marketing analysis and cumbersome accounts receivable and cash applications.

The Admiral system was originally begun on-line but ended up in what amounted to a logistical information system, according to Smith. It included on-line sales order entry, real-time inquiry for availability and price and a real-time finished goods inventory control, he said.

It also included credit checking, on-line shipments reporting, on-line in-transit reporting and automatic invoicing, he added.

The hardware consisted of a Microdata Corp. 1600 Reality with an extension to make it more flexible, he said. It was networked from the host — an IBM 370/168 — with communication links to the two midsized Microdatas.

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Scouts at Jamboree Learn More Than Wilderness Survival Skills

By Denise Petski
CW Staff

MORAINE STATE PARK, Pa. — An exhibit provided by a vendor enabled more than 30,000 Boy Scouts who attended the 1977 Jamboree here recently to learn not only traditional wilderness skills, but also how to survive in a technological society.

Sponsored jointly with California State College, which offered a $1,000 scholarship to the scout who proved himself most adept at modern problem solving, the Univac exhibit gave scouts the opportunity for hands-on interaction with a computer and a chance to qualify for merit badges.

Nine CRT screens in the Merit Badge Midway at the Jamboree were programmed to ask questions; the scouts responded with information about themselves and their planned activities. One screen provided a continuous calendar of Jamboree events.

Overall response was very good, according to a Univac representative, who said long lines formed to enter the exhibit. The scouts participating in the computer exhibit received credit toward a merit badge in computer science as well as the special Jamboree merit badge offered by California State College.

Setting up an operational computer system in a tent posed some technological problems for Univac representatives, according to C.H. Riley of Univac's Pittsburgh office.

To provide the necessary temperature controls, the computer was housed in an air-conditioned van parked near the midway and connected by cable with the CRT screens. Computer fans were able to tour the van.

Scout gets hands-on experience at the jamboree.

Program Design, Data Base Courses Set in U.S. Cities

NEW YORK — Structured Methods, Inc. will offer courses on "Infotech/Jackson Design Technology," "Data Base and the Organization" and "Data Base Package Analysis and Selection" in several cities in the near future.

"Infotech/Jackson Design Technology," a procedure for designing, writing and documenting computer programs, will be offered Dec. 5-16 in Washington, D.C., Jan. 16-27 in Chicago and Jan. 30-Feb. 10 in San Francisco.

"Data Base and the Organization," aimed at management and senior technical professionals, will be conducted Dec. 5-7 in Chicago, Jan. 16-18 in San Francisco and Feb. 13-15 in Washington, D.C.

"Data Base Package Analysis and Selection" will be held Dec. 7-9 in San Francisco, Jan. 9-11 in Chicago, Jan. 23-25 in Washington, D.C., and Feb. 13-15 in Toronto.

The fee for each of the data base courses is $475; the design workshop costs $1,400.

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System Conversion Woes Can Be Eased: GAO

WASHINGTON, D.C. — The problems involved in modifying programs from other DP sites as well as converting to an entirely new CPU can be eased in a number of ways, according to a report from the U.S. General Accounting Office (GAO).

In a brochure entitled "Provisional Checklist for Software Conversion Projects," the GAO outlines questions that should be asked and answered prior to undertaking the conversion effort. The report also lists steps to take during planning, execution and followup of the project. The GAO prepared the brochure in conjunction with its report to Congress entitled "Millions in Savings Possible in Converting Programs from One Computer to Another" [CW, Oct. 24].

At the outset, an installation should decide when the applications must be in production on the new system and whether work will be done by inhouse staff, staff from other agencies or contractors.

Contracting can be attractive if skilled specialists will convert the software for a fixed price, the report observed.

Managers should also examine their software inventory and determine what can be thrown away and whether some software would be less trouble to write new than to convert.

In addition, they should look at the expected useful life of the old software. For instance, emulation might be a satisfactory answer if long use is not anticipated.

Looking at data and files inventory, the manager should determine what can be thrown away, what incompatibilities exist between the old and new systems' file handling capabilities and whether bridging software needs to be written to automate the conversion.

A detailed inventory of software files and documentation to be converted should be prepared, the report indicated.

Also, managers should look at alternatives to conversion, such as obtaining usable existing programs for the new system and/or rewriting the old software. "The old software may be so bad that it should be thrown away and completely new applications written for the new system," the report continued.

The next step is to plan the project.

Select a contractor experienced in conversion who will quote a fixed price, and include lateness penalties and acceptance testing, the GAO said.

Look at the timing of the effort and determine if some useful preconversion can be done, the report said.

Another factor to consider is resource availability.

When assigning staff, the GAO recommends that team members be on the project full time.

The GAO recommends learning what automated conversion aids are available.

The planning phase should include an attempt to capture all possible information such as that from memories of project originators.

Execution Phase

The execution phase of the project should also include information capture and preparation of a schedule with definable milestones.

All the programs to be converted should be packaged with pertinent material.

The conversion effort should not involve redesign, according to the GAO.

Conversion should include documentation as an ongoing task. If possible, documentation should be captured in a machine-readable medium.

Last but not least, each program must be tested before it is released to production.

After the converted items are in production, the installation should immediately finish the documentation, the GAO said. It should keep results of test runs and ideas for future improvements.

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***Stephen L. Robinson**, who regularly writes the "Data base Corner" for Computerworld, has been affiliated with Performance Development Corporation (where he was Director of Professional Development), and CACI (where he provided educational and consulting services for data base projects). He has also lectured on data base for AMR International, the American Management Association, ACM and DPMA.*

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***Arnold Schron** has served a large, multi-divisional company in various technical and management positions including Manager, Data base Administration; and Manager, Marketing Information Systems. He was responsible for the application of analytical techniques to information data bases for marketing. Mr. Schron lectures on data base in the Computer Application Information Systems Department of the New York University Graduate School of Business.*

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SEE PAGE 3.

Editorial

Time to Face Reality

Little talk is being heard these days about a total rewrite of the 1934 Communications Act. Instead, members of the House Subcommittee on Communications seem to be concentrating on the primary instrument concept, which would require that the first telephone or other carrier device at a user site be supplied by the local telephone company.

The primary instrument concept is not new. It was proposed some time ago by the tolephone companies as an alternative to the connecting arrangements.

Only after the Supreme Court refused to consider the Federal Communications Commission (FCC) ruling on certification and registration of customer-provided equipment did Bell change its footwork to try to salvage something out of the interconnection squabble.

Giving Bell the toehold of one telephone at a location in order to preserve some of its revenue and control over its own facilities is not necessarily wrong. It may, in fact, be a beneficial solution to at least one portion of the interconnetion controversy.

But, in a larger sense, the user needs to know what will happen to the rights of those with customer-provided equipment. It appears that the Supreme Court decision not to get involved with the FCC registration situation has also taken away some of the impetus from AT&T's push for the Consumer Communications Reform Act.

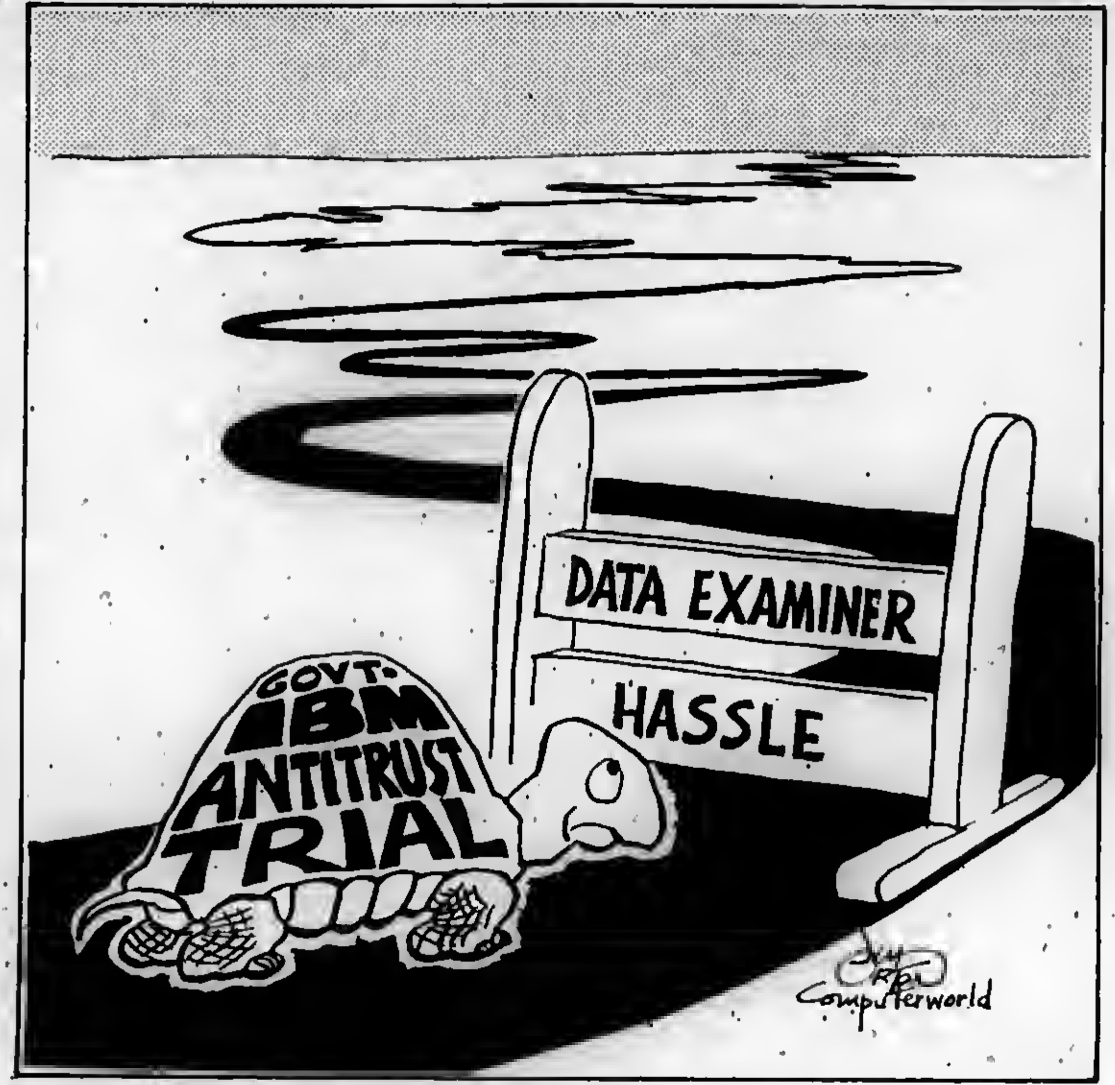
The House subcommittee should decide whether it wants to make communications and economics history with a Communications Act Rewrite or whether it wants to let the FCC go about its business of regulating the telecommunications carriers.

It may be that the congressmen have come to realize that there are very few votes directly connected with the issues raised by the Reform Act. The public at large cannot easily identify with a misnamed "consumer" bill that actually addresses the future of an important new industry.

Business telecommunications users have a vital stake in this controversy. They may not carry much political clout in the form of votes, but the companies they represent form the backbone of the gross national product.

Bell has lost the interconnection battle. More and more users have been enjoying the monetary and operational benefits associated with using noncarrier devices. It is too late for either the telephone company or Congress to stem this tide.

It is time that both organizations face reality and turn their attention to more reasonable pursuits.



Data Past

Five Years Ago
Nov. 15, 1972

OAKLAND, Calif. — Hugh Jeffrey Ward pleaded guilty to a felony charge of stealing trade secrets after he was charged with tapping a time-sharing computer and stealing a program. Ward's employer, University Computing Co. (UCC) had been fined $300,000 in a civil trial in which UCC claimed the program was not a trade secret because its code was printed in a newsletter by Information Systems Design, Inc., plaintiff in the case and a competitor of UCC.

— — —

Computer-based voting systems proved successful for the most part in the previous week's national election. But even though most systems appeared to work up to or beyond expectations, there were few isolated cases where dampness, slowed the card count and at least one case where it appeared that voters intentionally tried to "foul up" the system.

Eight Years Ago
Nov. 19, 1969

LOS ANGELES — IBM's Votomatic system was attacked at hearings conducted by the Los Angeles Elections Security Committee here. A witness who investigated the system testified that IBM knew its vote-counting system was not tamperproof and that the protective test "did not do the full job." The witness asked that use of the system be suspended.

— — —

PARAMUS, N.J. — Decision Systems, Inc. (DSI) announced a Cobol compiler for the IBM 360/20 that required only 8K of memory and had capabilities similar to those of Honeywell's Cobol B. Claimed to be completely compatible with other 360 Cobol compilers, the DSI Cobol operated under the Tape Programming System.

Letters to the Editor

Word of Encouragement

The "Apples and Oranges" editorial [CW, Oct. 24] touched upon a very frustrating problem, relating one line of computers to another. As was pointed out, this is difficult enough within one manufacturer's family. Crossing brand name boundaries is unreal.

I am far from sure that it is feasible to combine in one measurement both performance attributes that can now be measured by millions of instructions per second (Mips) and other attributes that can now be measured by throughput. However; I think it is desirable to try.

I encourage Computer*world* to carry out the proposal stated in the closing paragraphs of the editorial. Good luck in your quest for a universally acceptable measure for computer system performance.

H.S. Beers Jr.
New York, N.Y.

What Could Be Simpler?

Concerning the editorial "Apples and Oranges" [CW, Oct. 24], the answer is software physics.

K.L. Kashmarek
Moline, Ill.

DP Managers Not All-Knowing

I am writing in response to "DP Departments Urged to Tell — Not Ask — Users What They Need," [CW, Oct. 24].

Joseph J. Carr's premise that DP departments should tell the user what he needs rather than ask him what he wants seems to me to be a giant step backward. For several years, there has been a concerted effort in most DP shops toward becoming responsive to the end user.

To presume that a DP manager knows as much about the user's particular business and problems as the user does may be a serious mistake. A DP manager who possesses that level of knowledge is indeed rare.

I think Carr's efforts to bring line managers into the ranks of computer professionals are a step in the right direction, as he may get user-oriented DPers as a result. Computer people need to be businessmen.

I also agree with Carr's goal of channeling DP effort toward those tasks that meet corporate goals. I'm not sure how he has become more knowledgeable in the area of corporate objectives than the user managers, but I suppose in so doing he has precluded the need for a steering committee.

I may have taken Carr's remarks out of context, as I did not attend the session. If so, I apologize.

However, I do feel strongly that, in the end, the user must identify his needs and DP should respond to those needs.

James J. Nunnally
Denver, Colo.

Cross-References, Please

The article "Data Base Provides Business Model" by Frank A. Dottore [CW, Oct. 31] was very interesting. However, the article bears a striking similarity to a portion of the article "What Data Base Isn't" by Daniel S. Appleton, which appeared in *Dotamotion* in January 1977.

In future editions, CW should cross-reference related, previously published materials.

Dennis J. Broderick
Buffalo Grove, Ill.

Dottore acknowledges that others may have published thoughts similar to his, but he was unaware of Appleton's article. The ideas in the CW article are a distillation of an article Dottore wrote in 1973 after a data base study at Xerox. That article was published in a Xerox technical newsletter then. Ed.

Readers Disagree on Degree Requirement

By Jack Stone
Special to CW

The Human Connection

Regina Litman's letter in this column [CW, July 4] triggered quite a response from the readership. This and the subsequent column complete the four-part series on the issue of college degree requirements for data processing parsonnel. I'll present reader opinions; both pro and con, in each article.

Steva Turek, a programmer/-analyst with the Kansas City, Mo., municipal court, claimed that the ability to learn is a characteristic of the DP job and the degree tends to establish the existence of that ability. He writes: "DP is an ever-changing field. Therefore, it would be good to hire paople who can learn to do things in a different way. It is true a college degree will not guarantee an employer that the person hired will do a satisfactory job. However, if the job will require learning new concepts, then a college degree might increase the company's chances of choosing the right person."

Morgan Huff, vice-president and managar of the electronics department of Life and Casualty Insurance Co., said degreed people simply do better. "Why is it that people lika Litman always cry bias and discrimination when others (people with degrees) get better positions than they? . : . People with degrees are usually better performers and thus are rawarded better . . . It's because these peopla have proven two things; they were willing to devote at least four years . . . trying to improve themselves and they had the intalligence to pass the minimum requirements for such a degree."

Anthony Mustapich, DP director for Mountain States Bankcard Association, said that the degree is desirable but not requisite. "A degree . . . should be no more than a 'preferred' elament for cartain entry-laval positions. Degrees in other than business . . . or computer science would have evan further limited value, as would a graduate degree. In hiring for positions other than entry leval, work experiance, job performance and aptitude for tha higher level ara what counts. My present staff (including management) is a mixed bag educationally. Most have at least some college-level credit, and the modal level is an associate degree. The key is that their performance on the job is not directly tied to formal education."

James Ward, manager of systems for a midwest firm, expressing the viewpoint of an employer, said he differentiates in his recruitment policies for programmers and analysts. He stated: "The decision to hira is always a risky one . . . I was once told that a person should never hire someone until after they've worked together for two years.

"With tha exception of the point about the Certificate in Data Processing, all possible explanations mentioned (by Litman) for employer's preference for degread individuals may hava some validity. The fact is that there are always many applicants for any open position and the degree gives an employer some means of discriminating . . .

"I personally do not recruit entry-level programmers. Once a person has some work axperience, he or she can be evaluated on the basis of their work product and capabilities. A degree in this case is not particularly relevant.

"I do, however, hira entry-level systems analysts. I am concerned with recruiting individuals who have well-developed interpersonal skills and business acumen . . . I feel that I am much more likely to find these skills among degreed individuals and, in fact, seek out people with advanced degrees . . .

"All other things being aqual (which they never really are), superior educational credentials will always give a person an edge in both hiring and advancement . . . My advice to those who feel they are being held back through lack of a degree is to stop griping and go back to school. I know it's possible because I did it and now have two degrees to show for my efforts.

"One reason for not going back to school is that once they have obtained a degree, some people may have to find other reasons to explain their lack of professional advancement."

Finally, here is the viewpoint of a nondegreed oparations manager who feels he is "dead-ended" without a college diploma. He complains that ". . . At the tima of my last review, I was told I should not expect any further advancement unless I had a college degree. This made me stop and evaluate the situation. I am in my late thirties, a high school graduate, . . . and have been in DP for aight years, mostly in a supervisory or managerial capacity. I am self-taught in computer operations and programming.

"If I were to enroll in a degree program, it would take me saven to 10 years to obtain a B.A. degree. This is a long time to be "unpromotable," and because my employer is a progressive company, it could very well decide to replace me with someone more "promotable." That would put me up tha proverbial creek.

Letters to Stone should be oddressed to him ot 2233 Wisconsin Ave. N.W., Woshington, D.C. 20007.

Classifying Errors Can Ease Understanding

The Taylor Report

By Alan Taylor CDP

The complaint logs maintained on a typical data processing system are not particularly intelligible to outsiders — and you don't have to go far outside before someone becomes an "outsider" in this instance. Consider, for example, how often even the project manager has difficulty in understanding the situation shown by a well-kept set of error logs.

There has been very little work dona on handling this aspect of computers, yet what seems to be needed is a clear and generally understood language regarding errors that would form a framework to facilitate understanding.

There seem to be only a few basic types of error produced by systems, so a common language is certainly possible. The two basic errors concern inaccuracy and unsuitability. A report may have a perfectly accurate entry, but for one reason or another it can be unsuitable for the system's users. And that is as much an error as adding two and two incorrectly.

For instance, if the purpose of the system is to locate service facilities to handle a crisis within one hour and the output shows a service facility that cannot be reached for six hours, then it is simply unsuited for the purpose.

A result might also be unsuitable if following the result can only lead to correct operations if different working methods are involved, or if differently trained people use the system, or when the ability to compare the meaning of today's output with previous history is impaired by the way the output is produced.

Probably these types of errors are more frequent than errors of inaccuracy.

In the same way that there are various types of unsuitability errors, there are also types of inaccuracy errors. An entry may simply be wrong, such as a town's name appearing where a balance forward should appear. It may be incomplete, such as a monthly statement that doesn't have all tha entries on it. Or, it simply may be absent altogether.

A particular case of the "absant" type of inaccurate error is where the report concerned is late. Even though it turns up evantually, at the time it should have been present it was not.

Using this simple classification can help focus people's attention on both where something is in error and what alternative steps can be taken to handle the situation. (It does not deal with how the situation arose).

For instance, an error report saying that wrong information from a data base was given out on an inquiry for John Jones of 360 Roslyndale Blvd. when in fact there are two such people clearly falls into the "inaccurate" column so far as error analysis is concerned.

If inaccurate results occur — say a service call is sent to the incorrect address — the responsibility for producing accurate output must rest with the programmers and systems people. If, however, tha information is erroneous through unsuitability, users must also be involved in considering whether to change the program, training, manuals or personnel using the system — or abandon the system altogether.

The problem of "false" errors — errors that are possibly not errors at all — has to be considared in any error logs. One philosophy is that there is no such thing as a "false" error, the output may be correct and as expected, but if it causes even a claim of error, then that is a problam.

Another approach is to refuse to consider anything as an error until it can be shown in black and white that everything else was handled with inhuman perfection; and still something went wrong.

I don't think that either of these attitudes is good, but what really matters is consistency in the log. A possible middle ground is for it to include all claimad errors and to have a "reasonable investigation period" — say one week — for anyone to show that no error occurred. If someone does, the item is backed out into the unjustified complaint area. Really, each installation is on its own here.

We should adopt clean, common definitions of errors, keep track of them and watch the efficiency of methods used to reduce them. A few months or years of this tracked against system usage will give an understanding of the operational characteristics and safety quality of the system to anyone from chairman of the board to detailed maintenance programmer, and that is the type of common understanding we sorely need.

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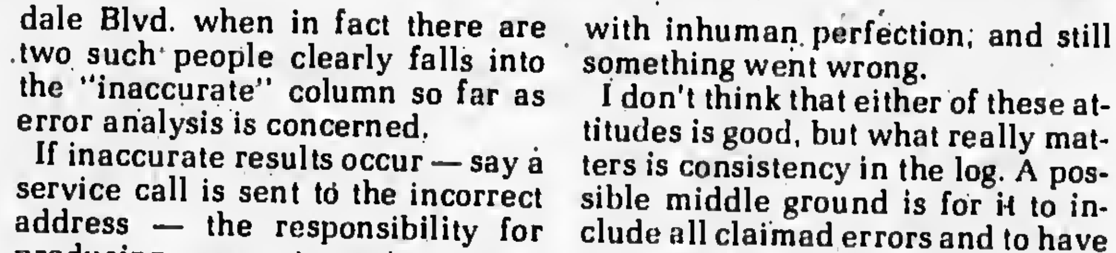
The Families of Computer Errors



Reader Commentary

Pompous Verbiage Clouds a Good Thesis...

By George J. Lehman
Special to CW

Frank Binder's castigation of education in general, and DP education in particular ["DP Education Worthless in Everyday Use," CW, Oct. 3] was a marked departure from the jargon and Spartan prose normally encountered in your publication.

Grandiloquence, however, can never be a substitute for clarity of thought.

Binder's jeremiad — crafted in three languages none currently used — did little to raise the literary level of technical writing but much to qualify him for the honorific "The Mister Malaprop of Data Processing."

Extreme caution should be used when employing phrases like "semiliterate twit," especially when the same writer spews forth words like "paleantology" (sic) and phrases such as "a duumvirate of perdition." "Duumvirate" means the rule by two men: When Anthony and Octavian retired Lepidus, they transformed the Triumvirate into the Duumvirate.

Mixed Metaphor

Binder's misuse of the word qualifies him to place the three initials, MMM, after his name. In this instance they stand for "Master of the Mixed Metaphor." Semiliterate twit is not, perforce, limited to the third person.

Binder's mirth-heaving shoulders, one assumes, would have commenced to droop had he paid closer attention to the German exchanged between Explorer I and Sputnik: the German world for "we" is "wir," not "wier." They would have collapsed in total chagrin when a whippet of a first-semester Latin student pointed out that the plural of "deus ex machina" is "dei ex machinis," not his proffered (and totally erroneous) "deii ex machinae."

Classical education received in Europe? To paraphrase his colleague from Alabama, "Yuh can matriculate a muskrat at Goettingen, but that doan make him a polymath."

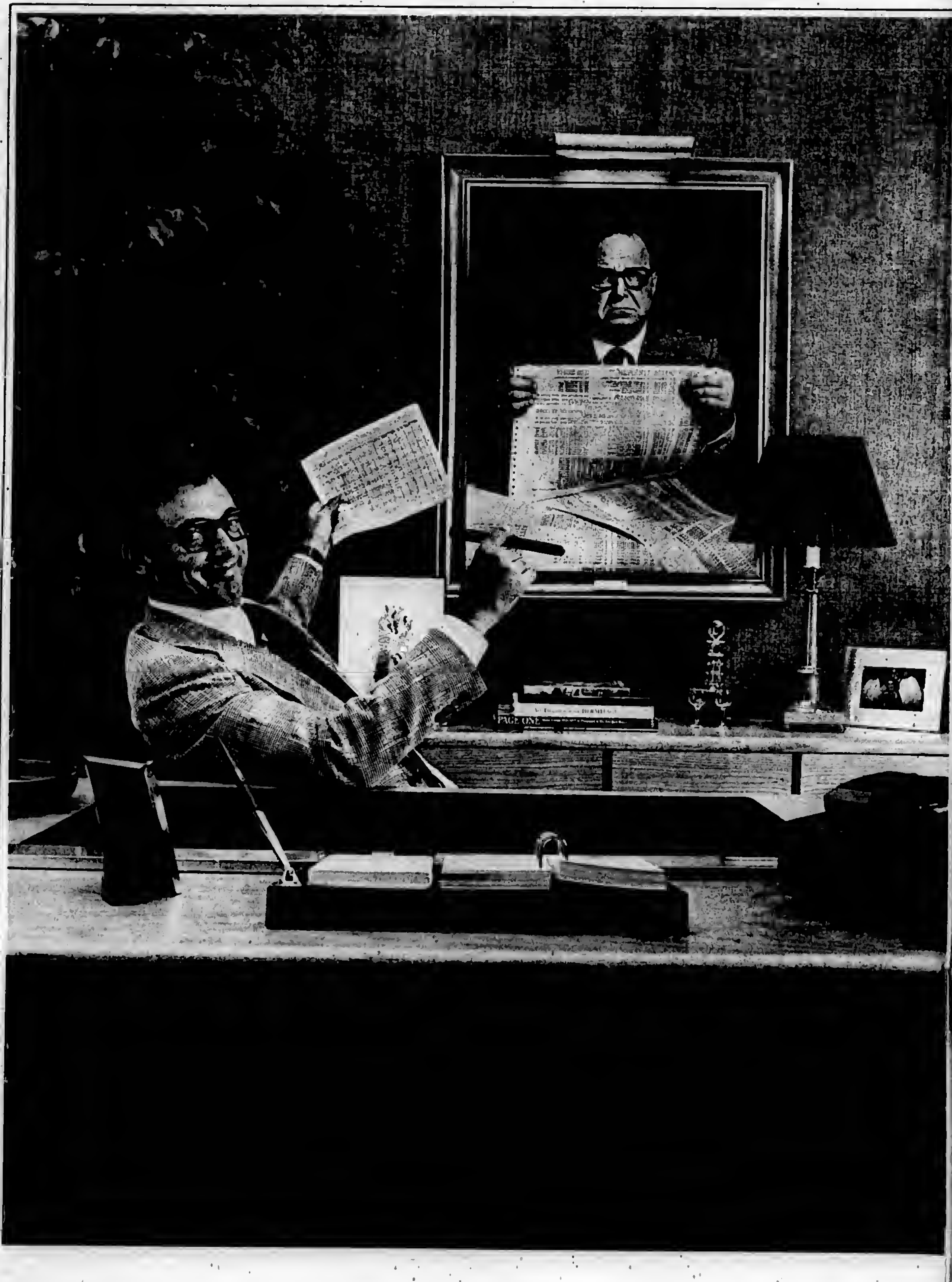
Act of Contrition

As an act of contrition, I suggest that Binder find some quiet corner at Air New England and there, like the errant Charles Bovary, devote himself to the conjugation of ridiculous sum. In penance, he can for three days personally debug all the core-dumps in his installation.

Admittedly, that is severe for a director of DP; however, if a Hohenstauffen emperor could be made to stand barefoot in the snow of Canossa for the same period of time, a truely [sic] contrite director can return to the cybernetic hog-slopping of "base plus displacement."

The unfortunate result of

(Continued on Poge 23)



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...But 'Speech Surgery' Stunts Imagination

Reader Commentary

By Frank K. Binder
Special to CW

I have several points to make regarding George Lehmann's critique of my Oct. 3 contribution to Computerwold.

First, I listened very closely to Sputnik's conversation with Explorer I, that's how I found out that Sputnik had a very heavy Russian accent. Hence the "wier" instead of "wir."

Second, 'Duumvirate" imaginatively translated is a rule of two, thus is rather properly used when emphasizing only two possibilities. This is certainly much more acurate than the constant improper use of the world "consensus."

Finally, I knew 38 years ago, when I was a whippet of a first-semester Latin student, and I still know today that it is "ex machinis." Had I any doubt, the often-used "ex libris" would have been a sufficient reminder. The "ex machinae" was a direct quote from an interview with a CPA and self-ordained DP expert. My secretary omitted the quotes.

She also misspelled "paleontology," hardly worse than spelling "truly" as "truely."

The editors of *Computerworld* also changed my 'modus bibendi' to 'modus vivendi.' It somewhat defanged my intended satiric flavor, yet it has never been my intention to shoot a horse because of an occasional stumble.

I'm glad Lehmann and I agree in principle. As for an over pedantic approach to languages, speech surgery only stunts the imagination.

Binder is director of doto processing for Air New Englond in Boston, Moss.

Clouds Hide Good Thesis On Learning

(Continued from *Poge 22*)

Binder's pomposity is that it obscures the validity of his premise: Education is generally abysmal, and DP education generally worthless. Had he concentrated upon those themes, he would have performed a valuable service.

As it was, however, he merely used them to flaunt his stilted prose and wallow in rhetorical puffery. How unfortunate! In his attempt to show us everything he knew, he showed too much: He demonstrated how superficial was much of his erudition.

In Words of St. Jerome

There is a point of balance, and it is to be hoped that in the future Binder might hearken unto the words of St. Jerome: "*Sicut enim o perfecto scientio procul sumus, levioris culpoe orbitromur soltem porum, quom omnio nihil dicere.*" (Remote as we are from perfect knowledge, we deem it better to say too little rather than nothing at all.).

Lehmonn is o DP consultont in privote proctice in Hollywood, Colif.

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Reader Commentary

That Comes in the Field

Teaching DP Nitty-Gritty Not Colleges' Job

By Temple S. Robinson
Special to CW

A recent *Computerworld* article that deplored the college-educated DPer was written as though every college student should be educated in the nitty-gritty of everyday operation.

This is not the purpose of a good university. The university teaches the language of the areas in which a student majors. In addition, it introduces him to the arts and languages of the world, showing him how to access the collected knowledge of the world.

When one takes a course in something with which he is familiar in a practicable way, it often seems the school is stupid. This is understandable, if one is familiar with the time span needed to gather knowledge, publish it and get it accepted by the academics. In a fast-moving technology that makes quantum leaps in a decade, it is impossible for the book cycle to keep up.

No university guarantees its graduates are the ultimate, nor should it. A lot of dedicated professors and scholars are trying to impart some of their accumulated knowledge to every student that comes under their wings.

Certain students always stand out in any discipline. This does not mean the others do not profit by it.

Not Trade Schools

There are some that would have our universities become trade schools. Please protect us from that. It is only the well-rounded person with a trained mind who contributes to the progress of technology and the world.

Some people can do this without the university — but not many.

The university, insisting on a broad spectrum, can turn out persons able to handle any job, with little additional training in the nitty-gritty. Expertise in a given technique should be acquired in the field.

The person with a university background is the one who can most easily understand the social impact of a new technology. The technicians usually have the feeling that their inside knowledge makes them the only arbiters of their trade.

Need for Compromise

The well-rounded person is aware of the compromises needed to interface the technology with the rest of the world.

It is the technician who wants to "reinvent the wheel" every time. He usually puts job insurance ahead of progress.

The university-trained person sees the need for common software and a systems approach to the job.

Buzzwords are bandied about on any job, where the "new boy" is trying to establish himself in a new environment. He uses this to boost his ego and overcome the cutting-down process of the technician, who feels superior because of his inside knowledge of a given operation.

The university is not blameless. It has to grab a new technology and build a curriculum to meet student demand. It has its failures, but is usually flexible enough to introduce change as needed.

It is almost impossible to get a person at the forefront of a technology to return to the classroom and teach. (Also, he usually is not a capable teacher.) It is therefore necessary for the staff to learn new skills and a new body of knowledge in a very short time.

I believe it is a duty of those of us who return for refresher courses to help the teacher with our knowlege, not to sharpshoot or deprecate the teacher because we happen to be knowledgeable in a given area.

To make the university really great, we should have people returning, at all times, for retraining. These people should be imparting their more current knowledge to the teachers.

In this way we can beat the book cycle and input knowledge more rapidly into the classroom.

One must not overlook the contribution of the language, linguistic and mathematics teachers (and writers) to the advancement of DP. It is their research and writing that has rapidly spread the word.

These dedicated people are the ones who should be praised, not damned, by the technicians.

Robinson, an airline pilot by profession, became interested in computers while assigned to a project on cockpit navigation. He now holds an associate degree in DP and is working toward a B.A., majoring in administrative computer science and minoring in accounting.

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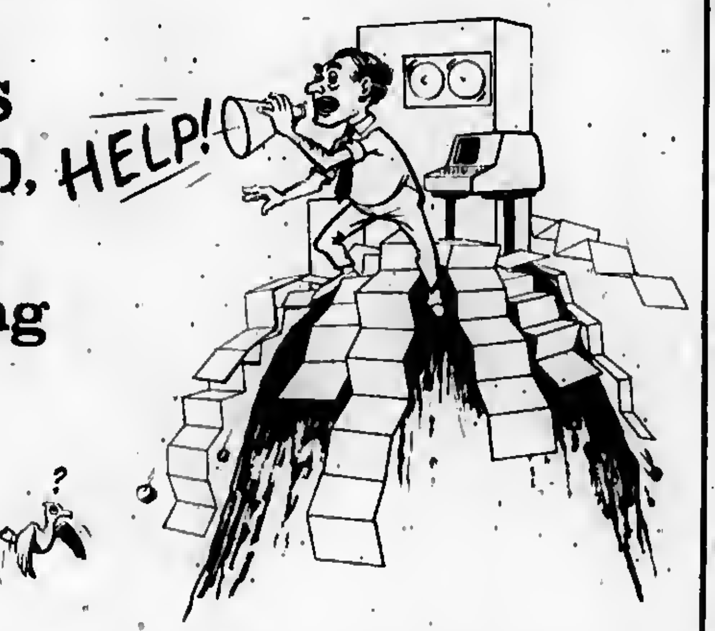

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DP's Position in Corporate Structure Shifted

By T.J. VanderNoot
And Rachel Bedford
Special to CW

A persistent theme in the literature of the data processing field is the ideal organization of the DP function internally — what structures are necessary or desirable for a DP department to perform its functions — and, externally, how the DP department should relate to the rest of the company or institution.

In 1967, the Japanese Computer Usage Development Institute studied 157 Japanese and 250 U.S. firms. In 78% of the U.S. firms, computer facilities were assigned to financial operations and reported through that chain of command.

In contrast, only 18% of Japanese firms reported through financial management.

During the past 10 years, DP has tended to move out of finance and into a more centrally oriented position in the corporate structure. A recent survey conducted by Syracuse University's School of Management found the proportion of DP departments reporting to financial management down to 59%.

At the same time, the proportion of departments reporting either directly to the president or executive vice-president or with a vice-presidential officer in charge of the department has climbed to 27%.

A hypothesis was advanced after the 1967 survey to explain why many more computer facilities reported to financial officers in the U.S. than in Japan. It was pointed out that the U.S. has had a longer history of automation, particularly with respect to unit record gear.

Reader Commentary

When computers came along, they were viewed initially as very large, fast unit record devices and were, therefore, assigned to the financial area.

Japan, however, had no such history of unit record systems and as computers began to appear, there was no prima facie reason for assigning the computer operation to any existing function.

For the Syracuse University study, 300 firms were selected from Fortune's lists of the largest firms and were sent a brief questionnaire. One indication of the importance many managers give to this subject is that 177 firms responded (59%), a very high response rate for mail surveys.

VonderNoot is president of Murroy, VonderNoot & Associotes Ltd. in Ottowo, monogement and DP consultonts. Bedford worked with the firm os o graduote student.

Letters to The Editor

What Did He Say? Only Lord Knows

I await Kenniston W. Lord Jr.'s promised articles on licensing and hope they will somehow clarify the first one of his series [CW, Oct. 17]. In paragraph 6 he wrote: "I was convinced that there was a problem and that licensing was a means of addressing the problem."

Without further reference to or definition of the problem, he said in paragraph 16: "I shall present one plan for addressing the issue in its entirety." But in paragraphs 8 and 13 he introduced two specific issues, whose relation to each other and to the problem were not stated.

Perhaps Lord knows what he is talking about. I don't.

David Ames
Watertown, Mass.

End the Effluvium

Perhaps the time has arrived for Ken Lord to find a new topic of interest outside of licensing and certification and for *Computerworld* to cease soiling its pages with his effluvium.

It is evident that the big push for certification and/or licensing emanates not from the bosses who pay the salaries, but from the "rational people" (hucksters) who foresee profits in fees for the exams and profits in the phony tutoring schools.

Mort Burdman
White Plains, N.Y.

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Bitslice and Waxworks Bring You

'Sounds of Computing' a Record for History

By Miles Benson
Special to CW

As the history of computing whips by at a nanosecond pace, few indeed are the computing buffs among us who can stand back, view that hectic pace dispassionately and contemplate recording the emergence of our new field for posterity.

The Sociology Of Computing

Think of it — a field born in the '50s, grown to maturity by the early '70s. That rapid growth must be documented in appropriate media before the memories of living through it slip away from us all.

It is in this spirit that the hypothetical record firm of Bitslice and Waxwords has brought out a new platter entitled "The Sounds of Computing." Destined to become a hit in computing circles, the record follows in the tradition of such other best sellers as "The Sounds of Sebring," "Steam Locomotives I Have Known and Loved" and "Exotic Bird Calls of Iran."

The opus is composed of three movements:

- *The 026 Keypunch:* — This is a real collector's item. The 029 may be newer, quieter and more efficient, but for sound buffs nothing can ever take the place of the old 026.

Listen as the 026 is switched on with a loud "click" at the beginning of an 8 a.m. shift and slowly accelerates into action under the practiced hands of a skilled keypunch person. The staccato rhythm builds to a climax at the 10:20 coffee break, then shatters as silence descends on the keypunch room.

At 10:30, listen carefully as the 026 begins punching Fortran source cards, then switches over to data input with a noticeable increase in punches per card and finally begins punching Cobol source with a nearly constant clatter of keys. Truly a nostalgic experience.

- *Poscol Time-Shoring Terminol:* — First time ever for this exciting new sound. Listen as the neophyte computer user sits down for his first time-sharing terminal session: At 1:05 into the session the system disconnects loudly because of a faulty charge number key-in.

Notice the striking similarity of the subsequent 1:05 to the preceding 1:05. A slow murmur of profanity precedes a new tempo as the system disconnects again and the terminal instructor takes over and keys in the proper sequence.

As the neophyte again takes over at 2:55, hear the interplay of the painfully slow user type-ins followed by rapid-fire system diagnostic responses.

What you are hearing is Pascal, a computer language especially well-suited to listening pleasure.

Notice at 5:17 as a faulty phone line causes a bad transmission and a resulting distorted rhythm of typing, followed by another system disconnect.

And in a strong climax, hear the excited talk of the user as he successfully receives the correct answer to his test program and types "BYE" in a thrilling intentional disconnect.

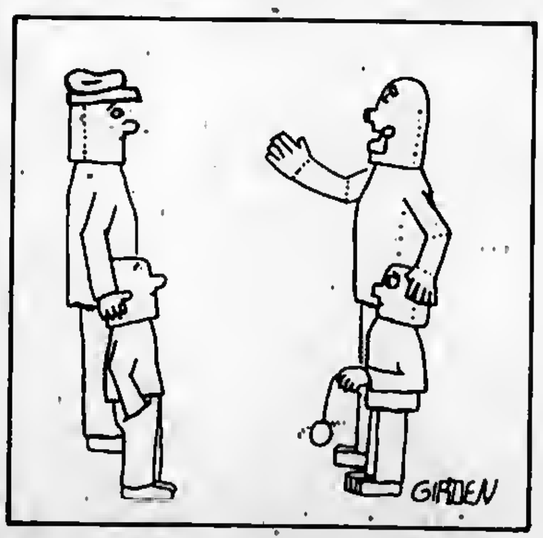
- *Checkout Session:* — Recorded on-the-spot during an all-night checkout session of a crash program. Excited voices and scratching pencils being applied to coding sheets make a cacaphony of sound to open the session. Hear first one, then another of the programmers spin off into wild improvisations on the basic theme of the program.

In a mounting frenzy, the program is readied for its first checkout run; time passes; we hear the programmers return, exhausted and discouraged, with the results of the first run.

Hear again the improvisations, each succeeding one growing less forceful as the programmer comes to realize that he, too, has not solved the problem.

And finally, in a beautiful tapering off of sound, the session lapses into three minutes of recorded silence punctuated only by occasional headscratching.

Rarely has the emotional nature of computing been better captured.



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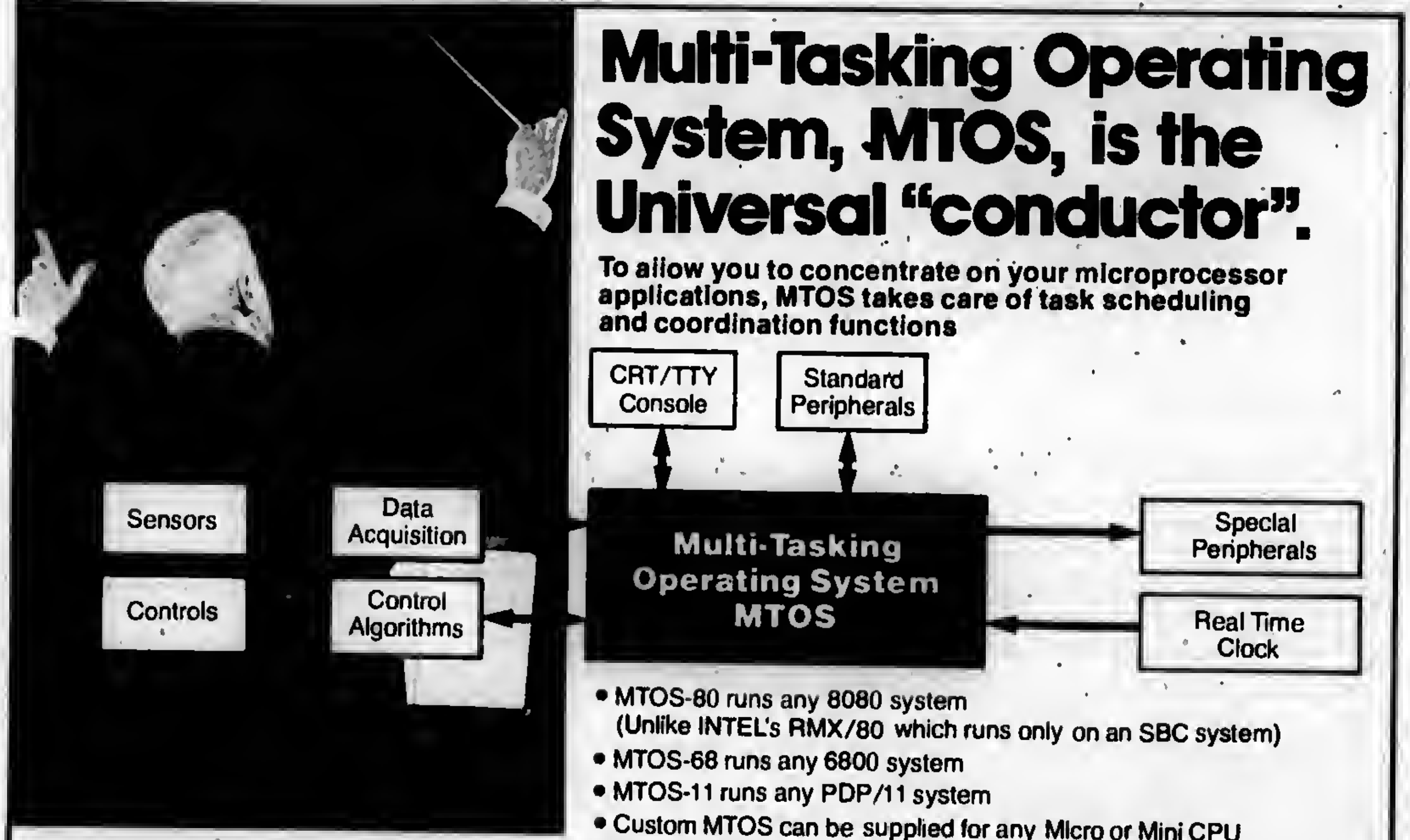

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Apply Yourself

Computerworld will publish a special report on application packages in January, and to make it as useful as possible we'd welcome articles contributed by users outlining their experiences with package acquisition and use.

Many installations don't know what benefits they should realistically expect to gain from packages, how they should check out what is available before they buy, what kinds of problems they may encounter in trying to install and what kind of help they might get from the vendors.

These are the points we'd like to cover. You can help with manuscripts limited to about 1,000 words (four typed, double-spaced pages). Please send them by Dec. 16 to Don Leavitt, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Package Designed to Tame Costs of Manufacturing

WOODLAND HILLS, Calif. — Costcontrol/80 has been developed to help IBM 360/70 installations in the manufacturing industry control investments in work-in-progress (WIP) and perpetual inventories, according to Informatics, Inc.

The system contains features for accumulation of actual and standard costs against work orders, WIP variance analysis, WIP and inventory valuation, labor distribution and purchase variance reporting.

Costcontrol/80 is the first product in a line of independent, functionally oriented software systems, Informatics said. The next one, according to the company's calculations, will be Shopfloorcontrol/80, intended to concentrate on work order release, scheduling and control.

Users were provided with insight into Shopfloorcontrol/80 last spring, however, when the Make Order Maintenance subsystem came out in May.

That phase of the whole operation will be joined by a WIP monitoring system, probably later this month, and by a package called shop paper generation and dispatching, expected to be issued shortly after the new year starts, a spokesman said.

Each of the software packages will integrate with Informatics' existing product line for manufacturers including, for example, Production IV.

The integration with existing environments — including data base management systems — has been made simpler, he said, by separating I/O operations into detachable subroutines.

Costcontrol/80, for DOS, OS and VS users, is written in ANS Cobol and will require 128K bytes in a DOS setting. It costs $25,000.

Shopfloorcontrol/80 will be in the $35,000 range, depending on the user's environment and subsystems selected, Informatics said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Forecasts to 1990

Service Shows Industry Trends

CAMBRIDGE, Mass. — The Economic Advisory Service (EAS), an industry analysis, forecasting and consulting service designed to assist business and financial executives and government policy makers, is now available on General Electric's Mark III remote computing network.

Developed by Arthur D. Little, Inc. (ADL), the service is said to be the largest on-line system commercially available today for evaluating interindustry relationships and for forecasting the outlook for key industry sectors.

Technological and regulatory changes anticipated by the developer's economists and other experts are built into the forecasts. The service pinpoints purchase-sale relationships among major industry sectors and its query capability allows users to evaluate the implications of the possible changes, an ADL spokesman noted.

EAS also provides forecasts to 1990 of the growth rates for more than 220 industry sectors of the U.S. economy, primarily at the four-digit "SIC" level of disaggregation. Forecasts of the dollar flows from each industry sector to over 250 final demand expenditure categories are also provided.

Hard-Copy Reports

Short-term and long-term forecasts of U.S. industrial performance are available to subscribers both on-line and in hard-copy form. The short-term views are updated quarterly, while the forecasts through 1990 are updated annually, GE said.

An annual subscription to EAS, in addition to the cost of resources utilized on the network, is priced at $15,000, payable to Arthur D. Little at Acorn Park, Cambridge, Mass. 02140.

GE's network, available internationally, is headquartered at 401 N. Washington St., Rockville, Md.

Lighter Micr Loads Handled

DALLAS — Banks and other financial institutions with check processing volumes that can be handled with a single magnetic ink character recognition (Micr) reader/-sorter are the expected users of the Super Micr-SS package introduced by University Computing Co. (UCC) for IBM DOS and DOS/VS shops.

Effectively an enhanced subset of the older Super Micr-One and Super Micr-Two packages which UCC produced for multibank, multibranch operations, Super Micr-SS is said to minimize main memory requirements while providing facilities that maximize resource utilization.

Using departments have capabilities to control the capture, distribution and reporting functions of the Micr system operation, according to a spokesman. With on-line reconciliation, rejects may be reentered and input transactions balanced before posting.

The disk-oriented Super Micr-SS supports both the IBM 1419 and the IBM 2956 Micr reader/sorters and requires "approximately 80K bytes" of main memory depending on the amount of custom coding.

The package costs $25,000 on a permanent license, but lease plans are also available, the spokesman said from 8303 Elmbrook Drive, Dallas, Texas 75247.

Extel Micro Gains Sales Accounting

LONDON — Computer Analysts and Programmers Ltd. (CAP) has developed a sales accounting package for users of the Exchange Telegraph Co. (Extel) floppy disk Micro-File microcomputer system, which is based on an Intel 8080.

The package includes invoice extension and printing as well as statement preparation, according to CAP.

Maintenance of a balance forward sales ledger, including aging of the accounts on the ledger and monitoring of their credit levels, is another function of the package.

The sales accounting system requires an Extel Micro-File with 40,000 characters of storage, two disk drives with 300,000 characters each and a CRT-based terminal.

The equipment and standard software, including a Basic interpreter, is marketed by Extel and costs about $14,440. The sales accounting software alone costs about $1,805.

CAP is at CAP House, 14-15 Great James St., London WC1, England. Exchange Telegraph Co. is at Extel House, E. Harding St., London EC4 4HB, England.

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UCLA Adds To 'BMDP'

LOS ANGELES — An expanded packaging of Fortran statistical programs that have been generalized beyond their origins in biomedical data processing, BMDP-77 is available from the University of California at Los Angeles (UCLA).

At the same time, a revised manual from the University of California Press — includes descriptions of seven programs that have been added to the earlier BMDP packaging. This book is available separately, and might be a useful way for potential users to study the package, a spokesman suggested.

Life Tables and All

The new programs focus on life tables; derivative-free nonlinear regression; general (unbalanced) mixed-model Anova; log-linear analysis of multiway tables; missing data estimation by regression; Furnival-Wilson (all possible subsets) regression; and quasi-independent models of two-way frequency tables, he explained.

Since all the programs in the package are written in Fortran, they can be run on many different CPUs. In an IBM OS environment using overlays, the programs require 160K bytes, the spokesman said.

The programs cost $1,500 — with discounts available to government units, nonprofit organizations and universities — from the Health Sciences Computing Facility, UCLA, Los Angeles, Calif. 90024.

The manual costs $11.50 and can be ordered from the University of California Press, 2223 Fulton St., Berkeley, Calif. 94720.

Correction

In "Software Scene 'Diseased' But No Cures Near: King" [CW, Oct. 10], a sentence was omitted that noted David King was echoing ideas and phrases originally voiced by English consultant Michael Jackson at an Infotech conference in London in February.

King acknowledged his debt to Jackson and said his mentor's text will soon be available in Infotech's "State of the Art Report on Reliable Software."

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General Ledger System Gains On-Line Option

ANDOVER, Mass. — Software International has developed an on-line support package for use with its General Ledger and Financial Reporting System. The enhancement operates in DOS or OS environments under IBM's CICS, the vendor noted.

The support includes on-line editing of journal entries and adjustments. A generalized data entry utility allows the user to define screen formats for the IBM 3270 or any plug-compatible CRT terminal, according to a spokesman.

Since batch balancing is performed at the time of data entry, the problem of rejections occurring at posting time has effectively been eliminated, the spokesman stated.

Inquiring into any account to find such things as the balance at the last posting is another facility now available. In similar fashion, retrieval operations allow users to review the way accounts are related to one another or the formulas used to apportion charges, revenues and expenses, he said.

The basic general ledger system is said to handle any account numbering system so the user's accounting department can establish its own pyramid of accounts and alter the organization as it deems necessary.

The system can handle complex consolidations of subsidiaries with unlike charts of accounts that even include currency conversions.

The general ledger and financial reporting system costs $25,000 to $46,500 depending on features selected. The on-line capability is an additional $7,500 for DOS users or $8,500 for OS shops.

CICS has to be acquired by the user, Software International noted from Elm Sq., Andover, Mass. 01810.

Preparation of CRT Screens Eased by 'Deft' Software

JACKSONVILLE, Fla. — Screen programs for IBM 3277-type terminals can be written in high-level languages without dropping into macro-type facilities with the Display Entry Formatting Under TSO (Deft/3277) package now available from Generic Systems, Inc. (GSI).

Key to the support is a screen librarian which allows the user to create a format on a 3277 under a regular TSO user log-on, a GSI spokesman said.

The formats are created, modified and deleted independently of the application programs that use them, he added, explaining that the formats, once created, are stored in a library to be accessed by callable subroutines provided with the package.

These subroutines are called by the user's program to combine variable data with the format and to decode data typed in at the screen.

One advantage of this system, according to the spokesman, is that the analyst or programmer can create the format on the screen well in advance of developing the program to use it. The format can be viewed, and possibly revised, by the user as part of the system design phase.

Revisions can be studied almost immediately since their generation does not entail a program compilation.

While Deft/3277 is essentially the TSO environment, an additional set of subprograms is available to operate full-screen programs under a Tcam message handler, GSI noted.

The package costs $2,000 and can be ordered from GSI at 4251 University Blvd. South, Jacksonville, Fla. 32216.

Univac 1100 Cobol Tested

SPRINGFIELD, Va. — A summary report on how well a Univac 1100 series Cobol compiler stood up to government evaluation is now available from the National Technical Information Service (NTIS).

The validation runs were conducted by the Federal Cobol Compiler Testing Service to see how closely Univac's Ascii/Ansi Cobol Compiler Level 4R1 (Exec-8 Version 33R2) met the high-level implementation requirements defined in Federal Information Processing Standards Publication 21-1.

These requirements are based on ANS Cobol '74 and the validation summary report (VSR) on the tests is made up of several sections showing discrepancies found, NTIS explained.

The first section is an overview of the validation that lists all categories of discrepancies that might be found.

The final part of the VSR is a detailed listing of discrepancies together with the tests that were failed.

Although listed by the testing service as CCVS74-VSR-230, the report is cataloged by NTIS as AD-A042 837/5WC. It is "published" on microfiche only and costs $3 from NTIS at 5285 Port Royal Road, Springfield, Va. 22161.

Surprise! Your 1100 LPM Printer used up $100,000 worth of paper this year.

CPU capacity may be getting cheaper, but computer supplies certainly aren't. Our example is true. An 1100 LPM printer running at full capacity will put out some 700,000 pages per month, at a cost of five to ten thousand dollars! (Small wonder that the charges for paper are often the biggest "surprise" in your DP budget.) The need for protecting your DP investment — often at considerable expense — has also increased. And that's why we've devoted our December 26th/January 2nd special report to the many ways to stretch your supply dollars, and safeguard your computer system.

Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
- An overview of DP media — what to look for, how to get it
- Pooling resources — how four companies share quantity discounts

We'll also look at the practical aspects of computer security in this report, with articles like these:

- Effective contingency planning — targeting danger areas
- Computer crimes and disasters — how to cut losses and minimize risk

If you're a DP Manager, MIS Director or Corporate Executive with responsibility for DP cost control and security, be sure to read the special report in our year-end combined issue. And if you market products or services that cut the cost of computing, or safeguard what's in the computer room — advertise in this report. Ad closing date is December 9. For details, call your Computerworld salesman. To reserve your ad space, call Terry Williams at (617) 965-5800.

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Dictionary 'Cornerstone' of Data Management

By Henry C. Lefkovits

Special to CW

Professor E. H. Sibley stated in the foreward to the book *Data Dictionary Systems* (written by this author and published by Q.E.D. Information Sciences, Inc., Wellesley, Mass.) ". . . it is my contention, backed up by sad experience and horror stories, that the data base management system user needs a dictionary more than the data base system. All too many industrial (and governmental) users have found that their data base system was relatively useless until they implemented a good dictionary system: thus I label the data dictionary the cornerstone of good data management."

Experiences of the last few years support this theory and have demonstrated a clear trend in the availability of sophisticated data dictionary systems, as well as the ability of some users of these systems to derive substantial benefits from them. In a great majority of cases the use of a data dictionary system arose almost as a by-product of the use of a DBMS, and many users of DBMSs are beginning to find out that a data dictionary system is a prerequisite for the proper use of their DBMS.

Before discussing the uses of a data dictionary system, it is appropriate to present a definition. A data dictionary system is an information system in its own right containing information about an organization's data base. Given a data item, the data dictionary will contain information about its attributes and usage. It will not contain its value. This simplified definition will suffice for this article.

All Data Management

There is no reason why the use of a data dictionary system should be restricted to the environment of a DBMS. For data stored in conventional files the use of a dictionary system can be even more important. These files very often date back to the time when data, and the management of this data, was relegated solely to the discretion of programmers.

The proper use of a data dictionary system allows for the establishment of an inventory of all such data and its associated usage. It enables an assessment of the current state of the data and the existing degree of redundancy.

The net effect of such an effort not only generally results in the reduction of costs associated with the management of the data, but more importantly provides a significant improvement in the quality of the data. It is then that the true benefits of better decision-making can be realized.

The preceding uses of a data dictionary system are facets of the management of the data resource of the corporation, an activity called data administration. The basic rationale for this activity is the recognition that data represents an important and valuable asset of the enterprise and that it should be managed and controlled as carefully as other resources and assets are handled.

The domain of data so treated is not restricted to data that exists in a machine-processable form: the full concept of data administration is concerned with the entirety of the data regardless of the medium on which it resides. This task is similar, though more extensive, than what the Ansi/Sparc report calls building the conceptual schema of the enterprise. It is more general since it also includes identifying all the processes that interact with the entities in the conceptual schema.

Clearly Complex

The complexity of this task is clearly substantial and a data dictionary system can be used as the basic tool with which the conceptual schema can be stored and manipulated. Clearly, care must be given to the choice of the proper data model and the manner in which this model will be handled by the dictionary.

Today a number of data dictionary products are available commercially. Most of these are described in depth and analyzed in the previously mentioned book. In some respects the differences between the various products can be substantial.

The decision to use a data dictionary system, as well as the selection of the particular system to be used, should be made carefully. A proper assessment of the benefits to be realized as well as the costs that will have to be incurred should be made.

The cost of acquisition of the data dictionary system itself is usually a small part of the total cost. Provisions for the entry of data to the dictionary, the on going maintenance of this data and the development of procedures re-

(Continued on Page 34)

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Trucker Rides DBMS Road to Increase Profit

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JACKSONVILLE, Fla. — The phrase "keep on trucking" could never apply to anyone more than it does to both Ryder truck lines and Transportation Teleprocessing Systems, Inc. (Trans-Tel). Ryder had revenues of $59.76 million in 1966 and more than $262 million in 1976. That's an increase of 340%!

One answer to this phenomenal growth is the dedication of the employees at both firms to the concept that they are part of one of the finest overall transportation systems in the country. Trans-Tel was formerly Ryder Truck Lines' DP department.

Prior to December 1971, Ryder was using a teletypewriter message switching network. Then the company installed message switching on its IBM 360/40, handled by a modified version of Qtam. The terminal system at that time reached about 80 locations.

Trailer control, the first application, was added to the system in May 1972. This provided up-to-the-minute information on all trailers involved in the intercity movement of shipments.

Evolution Begins

In June 1972 Brian Doran was hired to manage the computer operations and communications network. Under his guidance and management the evolutionary process began.

The control of tractors and over-the-road drivers involved in the intercity movement of shipments was added. This now provided the company with complete information concerning three factors that have a direct impact on customer services.

To meet the demands of the growth being experienced by Ryder, Trans-Tel was formed as a separate company in early 1973 and continued handling the corporation's DP and communications needs.

In May 1973, the second IBM 360/40 was added to insure system backup and 24-hour uptime. The next year was spent fine-tuning and expanding existing systems.

In May 1974, the on-line payroll system was added. It now produces more than 1,400 checks each week for drivers and does not require any paperwork to be sent to the office. In a period of 2-1/2 years the communications network had expanded to 150 communication terminals.

Meanwhile, Doran had begun looking for a data communications monitor to replace the home-grown Qtam-based system. Using a Datapro Research Corp. publication as a guide to potential suppliers, he decided in the fall of 1975 to acquire Total, the data base management system, and Environ/1, the communications monitor from Cincom Systems, Inc.

By the end of June 1976, Trans-Tel had rewritten and tested all of the trailer control, tractor control, driver control and on-line payroll programs and developed an up-to-date message switching system. This was done by a staff of five people, who also had to convert batch programs to function in a data base environment.

Growth presents problems as well as opportunities. TransTel now had about 180 active terminals on its network. The congestion resulted in an extremely serious deterioration of service to the users. This could not be tolerated even though a solution had not yet been determined.

Response time at the terminals varied from 15 seconds to 2-1/2 hours. Placing hardware monitors on its 360/40, Trans-Tel found it was using 97% of its CPU resources. In June 1976, one of the 360/40s was replaced by a 360/65 with 15 to 20 terminals on each of 14 circuits transmitting data 1,200 bit/sec. Response time dropped to a level consistently below 10 seconds.

On July 3, 1976, Trans-Tel shut down the old Qtam system and brought up the new Environ/1 and Total systems three hours later.

True Benefit Seen

"It was around October of 1976 that we realized the true benefit of data base/data communications (DB/DC)," Doran said. "A user came to us with a request for a new inquiry transaction. We were able to respond and have it operational within 24 hours," he said.

When asked to what he attributed the success of Trans-Tel's on-line network, Doran said "the success of any system depends on the amount of

(Continued on Page 34)

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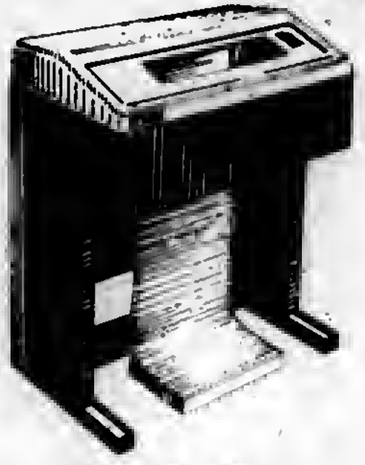

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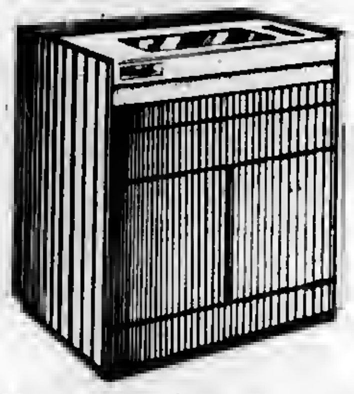

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Mixed Billing Technique Controls DBMS Accounts At Corporate Data Center

Special to CW

FULLERTON, Calif. — When you're faced with the constant yo-yo program of terminals being installed and taken out, the ability to accurately account for your total data base management system's (DBMS) budgets becomes very difficult.

That was one of the prime problems facing the Data Base Services Group (DBSG) of Hughes Corporate Data Processing Center here when it began exploring new methods for billing its customers for work handled by IBM's information management system. Operating under ASP, the group has an MVT 21.8 system that uses IBM 370/165s to support 65 IMS terminals in Southern California and Arizona.

The IMS billing system they had been using was based on a fixed charge per terminal plus hardware costs.

Chuck Allen, supervisor of DBSG, explained that at the beginning of each year, all of the resource and people costs were put into a pool. They then estimated the number of terminals which would be in operation, divided the pool costs and used that figure as a basis for their fixed terminal charges.

"The problem was that business is never static," he commented. "It is in a constant state of fluctuation. Because of the way we had established our charges, people would have the terminal removed when they had a downturn to avoid the cost. Then, when things got better, they would have the terminal installed again. We had to have a way of smoothing out the peaks and valleys."

In addition, the group wanted to have a more complete picture of system characteristics and profiles.

Flexible Package

To develop the control and accounting information it needed for the IMS system, DBSG chose Boole & Babbage's Control/IMS product.

"We weren't certain whether we would use the resource or transaction billing techniques, and Control/IMS would provide us with the flexibility and information we needed to make the best possible decision," Allen said.

DBSG felt that resource billing would be the most desirable technical method because it would provide a better control mechanism on users to refine some of their more poorly designed systems, which were using excessive amounts of IMS resources. Allen noted that this approach would provide the user with a "profit" initiative and free up resources for new applications.

While resource billing may have been the most desirable method of charging back the system, it was totally unacceptable from the user's standpoint. "First of all, budgeting by resource item by non-data processing personnel is too difficult," Allen explained. "To do it properly, they would have had to learn our language and right away you know you have a giant roadblock. Secondly, they couldn't budget for the year with any confidence since they didn't have the history file they would need to base costs on."

With the approach thought most desirable from DP's point of view, DBSG moved to transaction billing.

Initially, they set up three types of transactions — updates, inquiries, and data collection. They then spent three months computing various ways of charging for these transactions so that they would recover their costs.

"To accomplish this," Allen said, "we used all of the performance reporting tools available with Control/IBM."

They studied reports on who the users were, what levels of service were being provided and what and how much work they were doing. They also studied the high activity data bases that performed efficiently and how each data base was being used. They also studied transaction, program and region reports to develop a comprehensive and accurate picture of their system's characteristics and profiles.

"We suddenly found that by categorizing the types of transactions we had originally planned, we would be penalizing some systems more than others," Allen recounted. He explained that straight transaction billing penalizes heavy volume transactions that use few resources. However, update transactions that are clumsily written and poorly designed don't bear their proportionate costs.

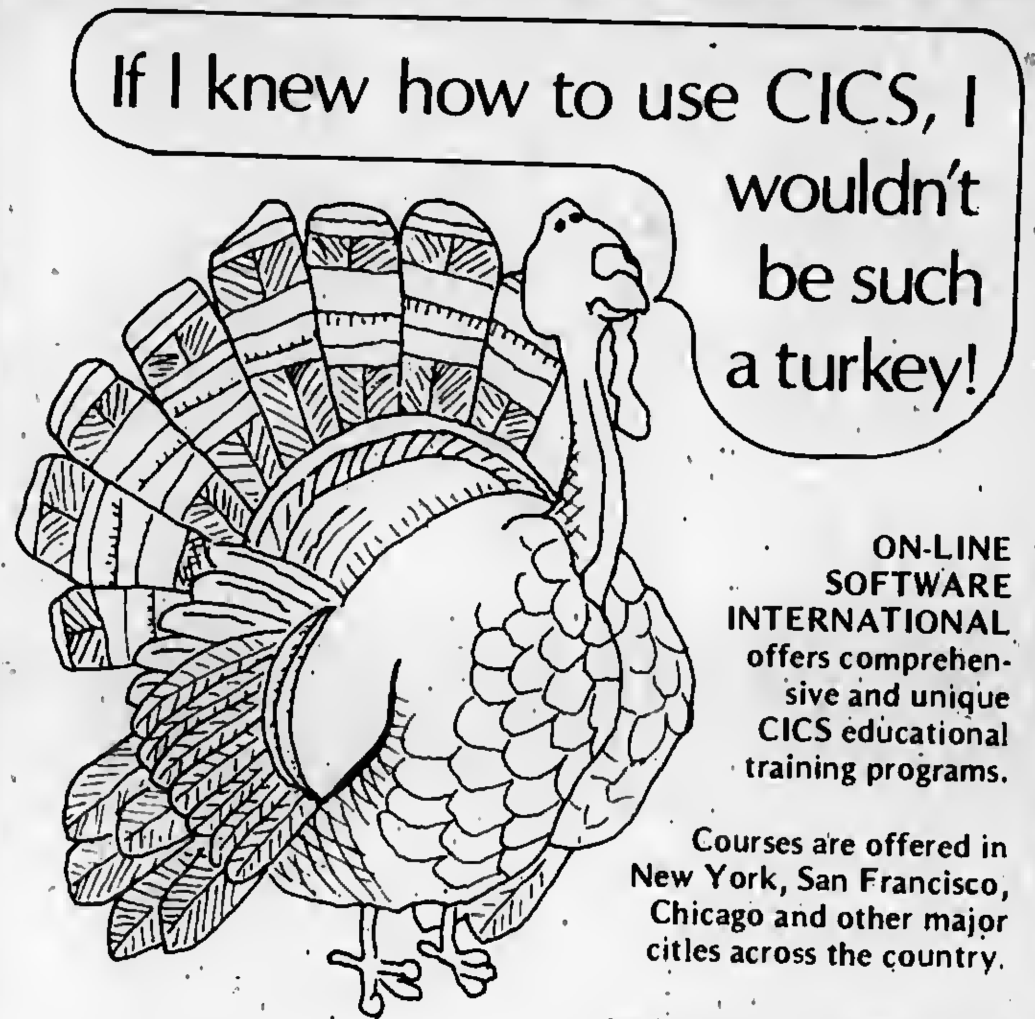
Because of this, the group developed a system which was more equitable. "We now have a system which has three types of transactions, all charged at different rates," Allen stated.

As a result of the improved billing technique, Allen's group has found there is a greater utilization of the IMS system. No one is asking to have his terminal removed when business is down and there is an increasing number of requests for more terminals.

"Management is very delighted with the fact that we can now accurately account for our operation," Allen said. "But we like it because now we can control our IMS situation. In addition, we're getting better action with our users as far as budgeting and new applications are concerned." He explained that users are constantly reassessing their budgets and are requesting trend and forecast information.

"We've had a number of other monitoring tools we have used in the past," Allen commented, "but Control/IMS provides us with all the information we need regarding what's going on in the system and it puts all of the data in one place rather than in a volume of reports here and there. We've been able to totally eliminate the use of DC monitors, tune new programs and applications and even troubleshoot when things go wrong. To develop the necessary performance reporting information, they operate Control/IMS on both their test and production systems.

According to Allen, though, the best benefits are a result of the need. He noted that since management was holding his group accountable for the way they were "running their business," they can now control and account for the business in a professional manner.



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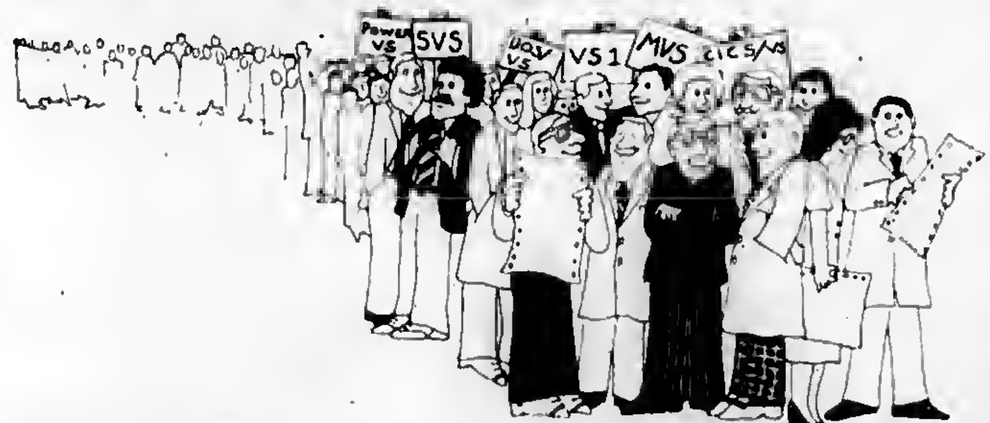

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Trucker Takes DBMS Route and Boosts Profits

(Continued from Page 31)

planning and experience that you have to put into it. We spent four full days with a Cincom Systems' engineer doing nothing but data base design on the front end of this system. The data communications aspect was the easiest for us. We knew what we wanted and we had four years of data communications experience. As long as Environ/1 and Total did what we were told they would do, we didn't anticipate any major problems," he said.

Never a Problem

"Since installing Total, we have never had a single problem with the software and there are not many products you can say that about today. Environ/1, on the other hand, did cause us some problems initially. Proper consideration had not been given to the tremendous volume of administrative messages we would transmit daily," he explained.

"We also had some annoying problems in our method of queuing incoming messages," Doran noted. "We were handling too much data for our original Total queuing technique. After discussing several possible solutions with Cincom, steps were taken to implement a byte string queuing technique which proved to be much faster," he said.

Trans-Tel now averages a message every two seconds, 24 hours a day, seven days a week, including all time for shutdowns, implementing new applications, backups and CPU downtime. "As you can see, we just had too much volume for our original queuing method," Doran said.

During the third quarter of 1976, Trans-Tel added several inquiry applications while maintaining the existing system. In the fourth quarter work began on sales applications to assist 167 salesmen and 160 terminal managers. This system was installed in January.

Another application implemented this year is the preventive maintenance inspections of all city equipment.

Currently, Trans-Tel is running two 512K IBM 360/65s under basic Edos with Memorex 3670 disk devices. Environ/1 is currently in a 348K partition, including a data base module size of 50K utilizing 20K for Btam.

There are 206 communication terminals on the network utilizing 14 lines at 1,200 bit/sec. Consideration is presently being given to expanding the network to 27 data circuits to further improve response time.

Data Dictionary Key to Control

(Continued from Page 30)

quired for the integrity of the system can be quite expensive.

Of all the projects undertaken by an organization the data dictionary is perhaps one of the most critical. Central to the success of a dictionary project is the degree of commitment that exists at all levels of the organization, including the highest levels of management. Proper understanding of the costs and benefits involved is a key element of this issue, this being true regardless of the environment in which the dictionary will be used.

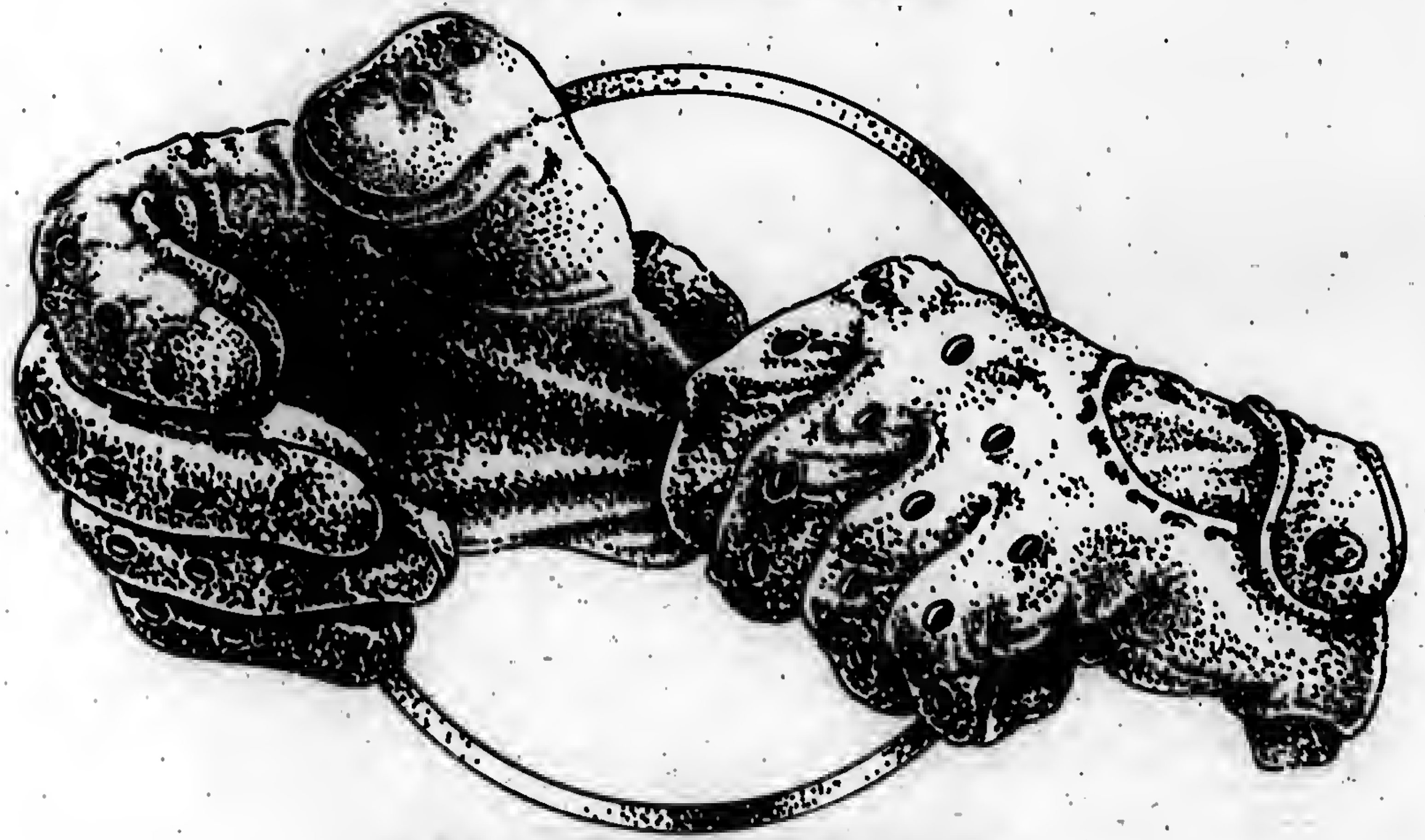
Responsibilities

Similarly, the administration of the dictionary itself must be reflected in the organizational structure of the enterprise and a clear assignment of the responsibilities associated with the integrity of the contents and use of the dictionary must be made.

The importance of data dictionary systems will continue to increase in the future. It can be expected that many parts of the total computing system will avail themselves of the facilities contained in a data dictionary system and some of its logical extensions, such as distributed processing and/or data bases. Additional momentum will be provided by privacy legislation, as the data dictionary system is a viable tool for the documentation of the usage of data and showing compliance with such legislation. . . .

Lefkovits is the president of Henry C. Lefkovits & Associates, Inc. of Harvard, Mass., a consulting firm.

Data Base/Data Communication



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. SEE PAGE 3.

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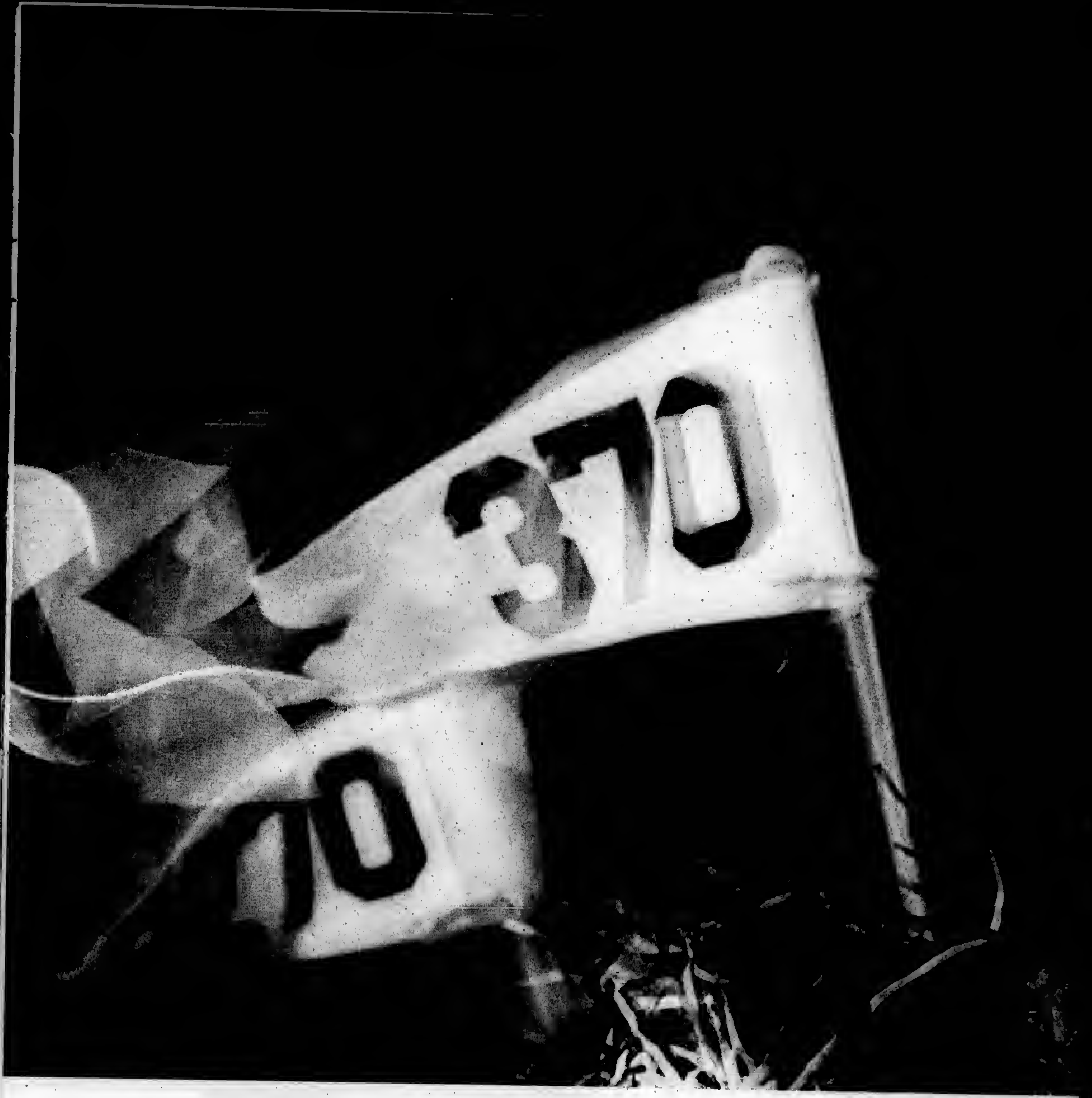

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'Latest Features' Don't Matter

Performance Seen Key to Terminal Use

By Ronald A. Frank
CW Staff

LOS ANGELES — Users should not be concerned if their communications terminals do not incorporate the latest state-of-the-art features. If the devices do the job for which they were intended, then they were worth the cost, according to Dennis J. Cagan, president of The David Jamison Carlyle Corp., a terminal supplier.

In advising users on how to select CRTs and teleprinters, Cagan told attendees at a recent Interface West session here that once a required set of features is defined, the next area of concern should be equipment reliability.

When it comes to reliability, Cagan said, most terminals have about the same performance levels. A CRT can be expected to fail about two times per year; a teleprinter will fail about three to four times per year on the average, he noted.

One of the best ways to evaluate potentially suitable devices is to ask vendor salesmen their opinions on competitive equipment. Although some users view this approach as being questionable, there is nothing wrong with the user taking advantage of any information which he can gather before making a decision, Cagan said.

CW at Interface

Another way of getting information on equipment under consideration is to contact existing customers. Whenever possible, the user should first try to find nonsatisfied users of the terminals, he suggested.

Competing sales representatives often have information about unhappy users since these are the type of prospects to which they are interested in selling, Cagan said.

After any negative information has been collected about a particular terminal, it should then be discussed with satisfied users to see whether it is accurate or just relates to an isolated case.

Existing CRT and teleprinter users should be asked specific questions on how the vendor reacted in maintenance and other support situations. It is also important to find out whether the vendor complied with promised delivery schedules or whether the terminals were installed late, Cagan stressed.

An existing user should be questioned on the level of service provided when malfunctions occur. The user's real opinion of a vendor will probably come out when he is asked whether he would buy the same terminals again or whether he plans to add more in the future, Cagan told the attendees.

Terminal users should carefully evaluate the need for vendor maintenance, he added. Many of the currently available terminals can be maintained by most staff members who can use a screwdriver, he explained.

Most one-year maintenance policies cost at least $12.50/mo per terminal and it may be less costly to stock spare components like circuit boards and replace them in-house. If a staff member can repair a teletypewriter, there should be no problem with maintaining the current CRTs and teleprinters, he said.

In the area of pricing, local distributors often provide terminals at lower costs than the vendor. In addition, the user should be aware of available discounts; it may be less cost per unit to get a larger number of terminals if this puts the user into the next higher discount bracket, Cagan said.

PTTs Hold Nine-Tier Job

LOS ANGELES — Although it is widely known that the Postal, Telephone and Telegraph (PTT) authorities in various foreign countries are responsible for administering communications services, the exact areas covered by the PTTs are not often defined, according to Leonard Elfenbein.

Speaking at an Interface West session here recently on international carriers and services, the consultant said the PTTs are responsible for nine major types of services in most countries.

Time-sharing and data base applications are covered by the PTTs, as well as joint use and line-sharing regulations. Transmission of data across national borders and the administration of data on switched public networks are also PTT responsibilities.

Telex dial-in and dial-out services and data terminating regulations fall under the domain of the PTTs, as well as the administration of interconnection, which includes authority for type approval of accepted equipment.

The PTT's responsibilities also include the encryption of data and cover Telex, public switched networks and private line facilities. In addition, the PTTs set tariff surcharges and discounts depending on local regulations.

Discounts are often offered if a user selects a country as a hubbing point in an international net. In rare cases, surcharges can be levied, for example when a user does not transmit data at the rated speed of a line, Elfenbein said.

Software Provides Telenet Link For Burroughs, Univac Systems

WASHINGTON, D.C. — Telenet Communications Corp. has developed software packet network interfaces for Burroughs B6700 and B7700 systems and Univac 1100 series systems.

Both interface packages will be provided by Telenet under a licensing arrangement and are expected to be available for customer installation next month, according to a spokesman. A similar network interface for IBM 360/370 systems has been offered by Telenet for some time.

The software interfaces are said to offer two advantages to network users, faster response time and lower cost. They permit the user to handle a large number of simultaneous virtual connections over a single full-duplex access channel connecting the computer to the Telenet network, the spokesman said.

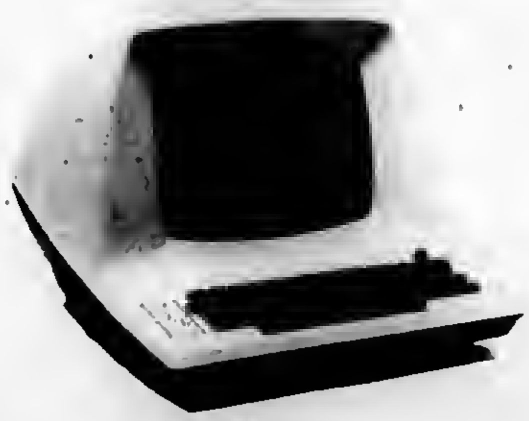
In addition, the software features full error control between the host computer and network and statistical multiplexing which minimizes bandwidth requirements, Telenet said.

The Burroughs interface supports asynchronous terminals and communicates with the network using the CCITT X.25 packet protocol. The package was designed to operate on any B6700 or B7700 with a Burroughs data communications processor.

The Univac interface operates as a user program at the real-time level and uses the Telenet Host Interface Protocol to handle asynchronous terminals.

The Univac interface can be used on 1100 series systems which have at least 192K words of memory and a high-speed synchronous communications terminal module.

Both interface packages will be offered by Telenet for a one-time installation and licensing fee of $1,000 and a recurring fee of $325/mo covering maintenance and program updates. Telenet is at 1050 17th St. N.W., Washington, D.C. 20036.



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Vadic Modem For Dial Lines

SUNNYVALE, Calif. — An originate-only full-duplex 1,200 bit/sec modem for use on dial-up lines is available from Vadic Corp.

Designated VA3416, the modem costs $720 including VA1601V chassis and power supply.

The VA3416 is crystal-controlled and can transmit and receive at 1,225 bit/sec permitting it to operate with multiplexers. With Vadic's data access arrangement, registered with the Federal Communications VA3416 directly connects to any dial-up telephone, the company said.

Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

Computek Adds Text Processing System

BURLINGTON, Mass. — Computek, Inc. has enhanced its Series 200 intelligent terminal system with a communications-oriented text processor.

Called Econotext, the system combines the Series 200 processor with up to four 2,000-character CRTs, 1.5M bytes of mass storage, optional hardcopy printers and software for text input, file management and applications programs.

Econotext software includes three operating modules: The editing module controls editing and movement of text on the CRT screens; the file management module lets the operator store, retrieve and manipulate text on diskettes and access print routines; and the communications module allows the system to transmit text one-way to remote sites.

The system is designed for use by newspapers as a reporter station, remote bureau terminal or in newsrooms, the company said.

Econotext can transmit data at speeds up to 9,600 bit/sec and it is compatible with United Press International and Associated Press high-speed wire service protocol, Computek said. Since communications is under program control, other protocols can be implemented.

Exceptional Clarity Claimed

The system CRTs display the 128-character Ascii upper and lower case set plus control symbols using a 20 by 14 dot matrix, which the firm claims has "exceptional clarity." Each terminal can access text in its own memory buffer of 5,400 characters and the contents of the buffer can be altered by writing or reading from local diskette storage.

A typical stand-alone system with dual drive floppy disk, 5,600-character buffer and communications costs $11,250. A "quad" system including four CRTs, floppy disk, buffers and communications costs $22,500 or $5,625 per terminal.

Computek, a subsidiary of General Automation, is at 63 Second Ave., Burlington, Mass. 01803.

M&R Enterprises Has Modem in Kit Form

SUNNYVALE, Calif. — The Pennywhistle 103 acoustic coupler, a modem in kit form, was introduced by M&R Enterprises.

The unit can record data from a terminal or a computer on audio tape for playback and can also be used for telephone "hamming" or communications with the deaf, according to a spokesman for the firm. Data recordings can be made without critical speed requirements and the device will operate in the half-duplex or full-duplex mode, he said.

The kit, which includes a three-stage filter and complete documentation, costs $129.95 from M&R Enterprises, P.O. Box 61011, Sunnyvale, Calif. 94088.

Teleprocessing, Nets Subjects of Course

NEW YORK — A course on teleprocessing (TP) systems and network design will be offered by American Management Associations here on Nov. 28-Dec. 1.

The course, meeting at association headquarters, will cost $540 for association members and $620 for nonmembers. Team discounts are available for groups of three or more at $460 for association members and $525 for nonmembers from American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Guess who gets to do Replacement Cost Measurement this year?

Probably you!

Last year was the first time the SEC required major corporations to undertake replacement cost measurement. Complying with Accounting Series Release 190 (ASR-190) was a struggle. For the most part, the job was done manually by staff. It took loads of time, cost plenty of money and so companies are now looking for an easier way to do it.

This year many corporations are assigning this responsibility to data processing departments. Now you're wondering whether internal or external systems development is the answer. Relax, we've got an alternative.

Meet VSCOM-190

VSCOM-190 is a system designed by Valuation Systems Corporation and available on COMSHARE's international timesharing network. It enables your company to effectively comply with ASR-190. VSCOM-190 provides:

1. Solid experience in replacement cost/current value measurement. Many major corporations got accurate information from VSCOM-190 last year.
2. Up-to-date and comprehensive domestic data that is immediately usable without refinements.
3. The most extensive foreign index data available anywhere.
4. A special module which makes it easy for you to gather your company's basic data.
5. A system that has been updated to reflect the latest SEC requirements.
6. Low, low cost with charges based only on usage. In fact, experience has shown that these costs are much lower than if you did it manually.

There's much more you should know about VSCOM-190. For more information, send in the coupon below, or call Bob Held at (313) 994-4800.

(Mail to:)
Robert J. Held -
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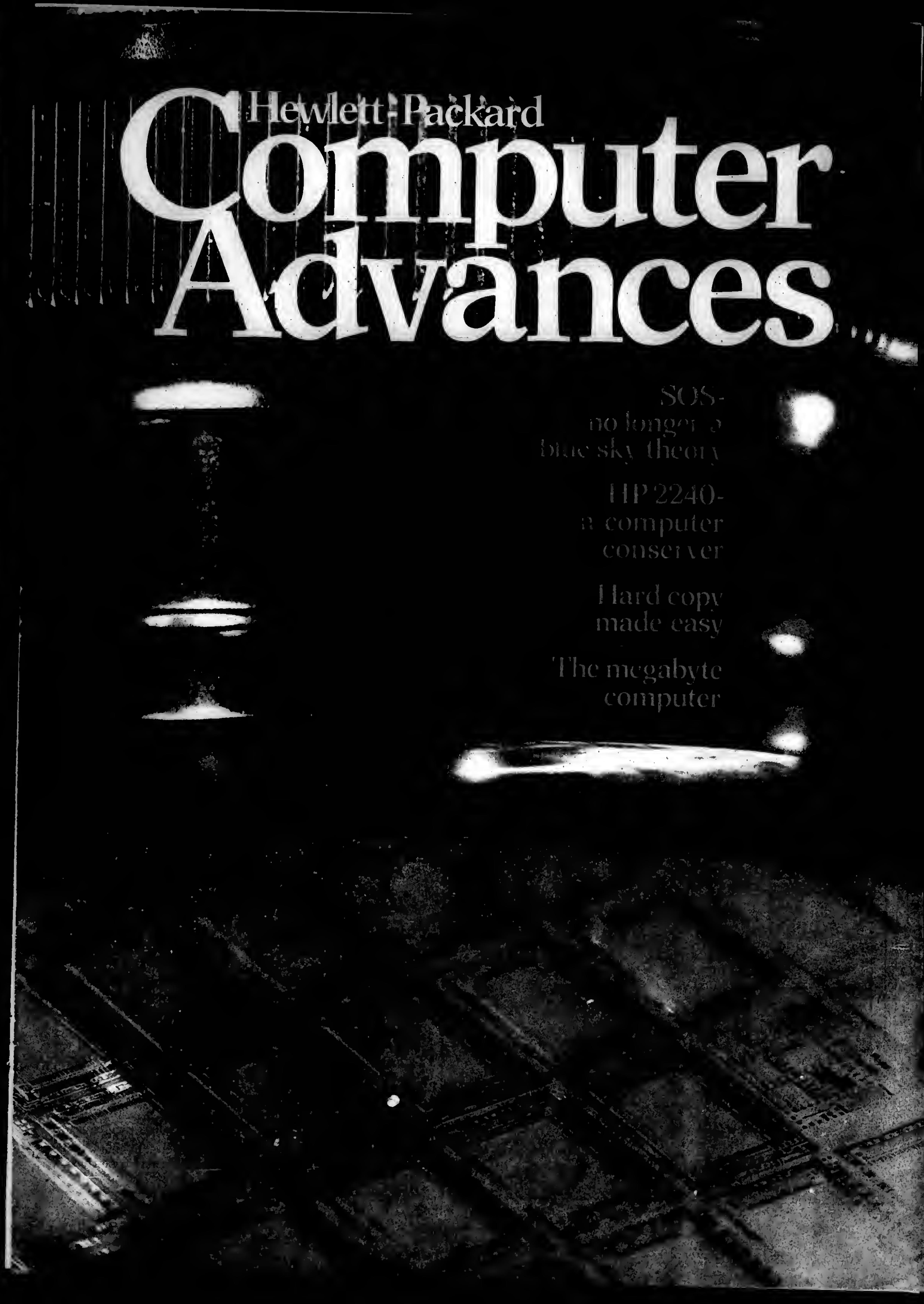
Hewlett-Packard

Computer Advances



SOS-
no longer a
blue sky theory

HP 2240-
a computer
conserver

Hard copy
made easy

The megabyte
computer

SOS - a blue sky theory comes down to earth

Five years ago, Hewlett-Packard established its silicon-on-sapphire technology laboratory in Cupertino, California. This investment was prompted by a recognition of the customer benefits to be gained in our products from a CMOS/SOS (complementary Metal-Oxide Semiconductor, Silicon-On-Sapphire) process.

With sapphire, a non-conductive material, we can achieve superior dielectric isolation which enables high speeds and close packing of circuits. We are also able to eliminate parasitic capacitance.

For example, our Phi chip, with an area of 28mm^2, contains 8,000 transistors. Phi serves as a single chip interface between any microprocessor bus and the HP-IB* and runs at speeds up to one megahertz while typically consuming only 300 milliwatts. Low power consumption is another SOS charactertistic.

Much of our effort during these years has been in establishing reliability and producibility. HP has recently introduced three new products that use several types of CMOS/SOS chips...

◀ *Cover*

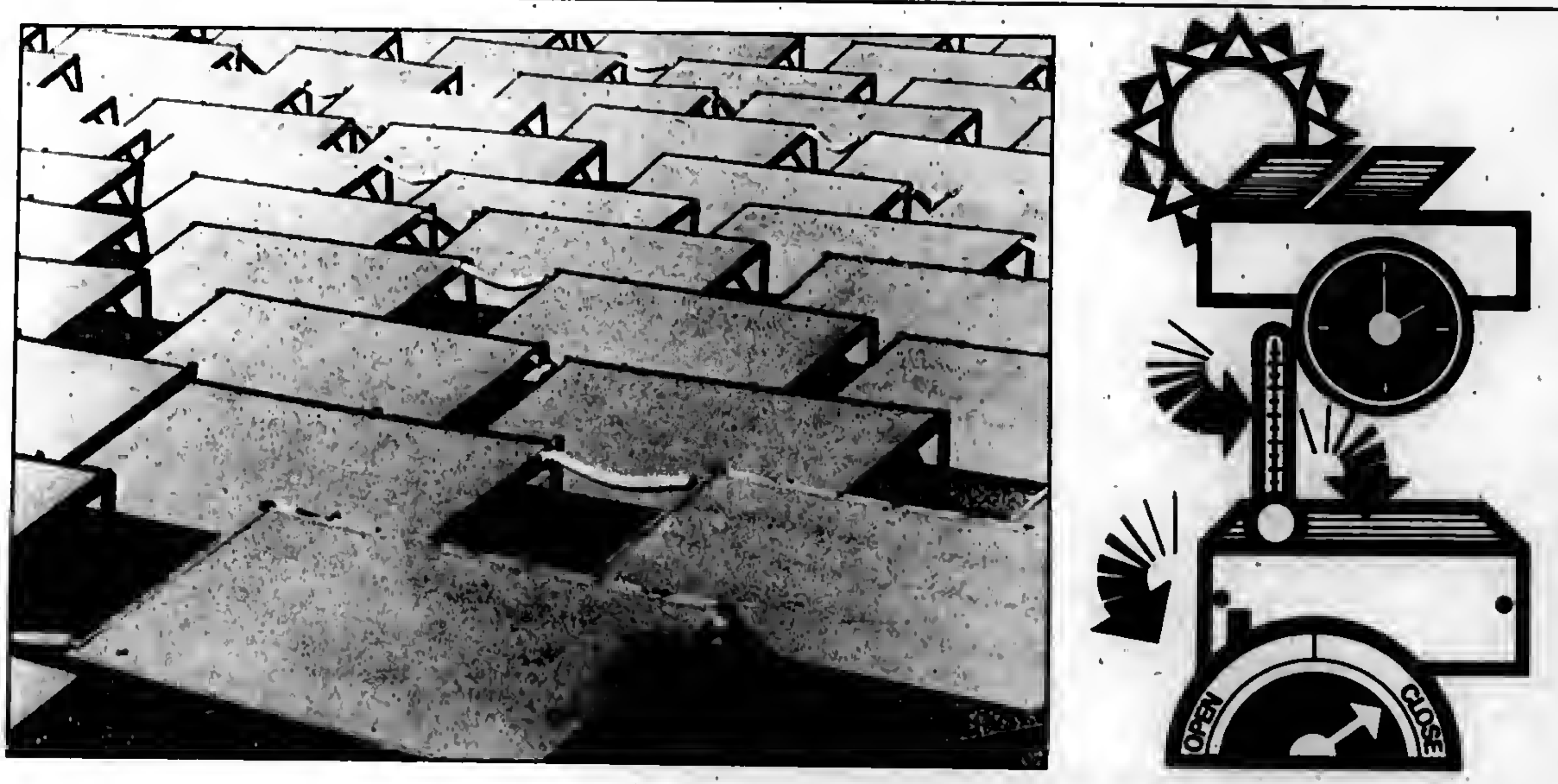
There is an average of 200 dies on one of our three inch SOS wafers. The process of separating them into individual chips is similar to that of glass cutting, but as sapphire and diamonds are nearly neighbors on Mohs Hardness Scale, it is not possible to score the wafers with any diamond cutter. Only a laser scriber, whose power reaches far into the deep infra-red, can melt and evaporate the sapphire in preparation for mechanically breaking the chips apart.

With SOS, the HP 2240 is a computer conserver

The HP 2240 processor is HP's first measurement and control subsystem based on SOS technology. It simplifies product testing and real-time data acquisition, monitoring, and control; and can be used with 21MX-based systems, HP 1000 computer systems, or HP 9800 series desktop computers. The HP 2240 can also operate remotely with the HP 3070 data collection terminal or over telephone lines with HP's common carrier interface.

Built-in intelligence

Microprocessor-based intelligence makes testing easier and less expen-



One-line program
WU,600,000 AI,3,2,10, A0,4,3,1,50!

Time WU, 600,000
Wait until the 2240A elapsed time clock reaches 600 seconds, 0 milliseconds, which is ten minutes.

Measure AI,3,2,10
Input 10 sequential analog readings from the temperature sensor on channels 2 through 11 of card 3.

Control A0,4,3,1,50!
Output 1 analog voltage to to the hot air damper to close it 50%.

Solar heating is just one application that can be automated with HP's new measurement/control processor. For example the HP 2240 can measure room temperature at specified intervals—every ten minutes, for example—and control that temperature by regulating heat transfer from the system's solar panels. This is accomplished by three simple statements from the HP 2240's extensive set of high level commands. A similar solar panel-to-hot water heat transfer system was initiated by employees at HP's Sunnyvale, California site and has been running successfully for the past four years.

sive than with previous systems. With HP's Micro-CPU Chip as its heart, this processor executes critical real-time tasks that previously had to be handled by the computer. This frees the computer to do more appropriate tasks.

High speed, low power

SOS technology allows the HP 2240 to gather, store, and correct measurements at a fast 20,000-per-second rate. Yet this impressive performance is possible with a minimal amount of power — the HP 2240 draws no more current than a 150 watt lightbulb.

Easy as one, two, three

Microprocessor control couples with the Hewlett-Packard Interface Bus (HP-IB*) capability and can make an HP 2240 system operational within hours, in three easy steps.

First, you interface the HP 2240 to the computer via a single HP-IB cable; second, connect the HP 2240 to your sensors or controls via one of a large assortment of measurement/control cards; and third, instruct the HP 2240 to perform the real-time task with the aid of a simple, one-line program.

Two in one

The HP 2240 has the ability to measure and control both analog and digital signals, thus lowering automation costs in manufacturing and

Continued on page 5

Hard copy made easy with SOS-the HP 2631/2635

The new line of HP 2630 serial printers has just been announced. The HP 2631 is designed for environments requiring a low-cost, high performance printer. The HP 2635, the same high throughput printer with a keyboard, is suited to interactive environments. These printers operate at 180 characters per second (cps.)

Both printers are controlled by a silicon-on-sapphire (SOS) microprocessor system designed by HP.

Printing versatility

The HP 2631/2635 offer as standard features those capabilities that are often optional on other printers. For example, there are three print modes — normal (10 characters per inch), expanded (5 characters per inch) for titles and headings, and compressed (16.7 characters per inch). Compressed mode, an economical paper saver, allows you to generate reports in 8½ by 11 inch format with 132 characters per line, and to pack 227 characters per line on standard-sized computer paper. These three print modes can be intermixed on a single line. Lines can be spaced at vertical pitches of 1, 2, 3, 4, 6, 8, or 12 lines per inch, so the printers accommodate subscripts and superscripts.

The HP 2631/2635 support the USASCII 128 character set, including control codes which are accessible through the display functions. Use of a 7-column by 9-row dot matrix allows printing of descenders (for normal looking "g's" and "j's"), commas, semicolons, and underlining. You get high resolution print that is crisp,

---

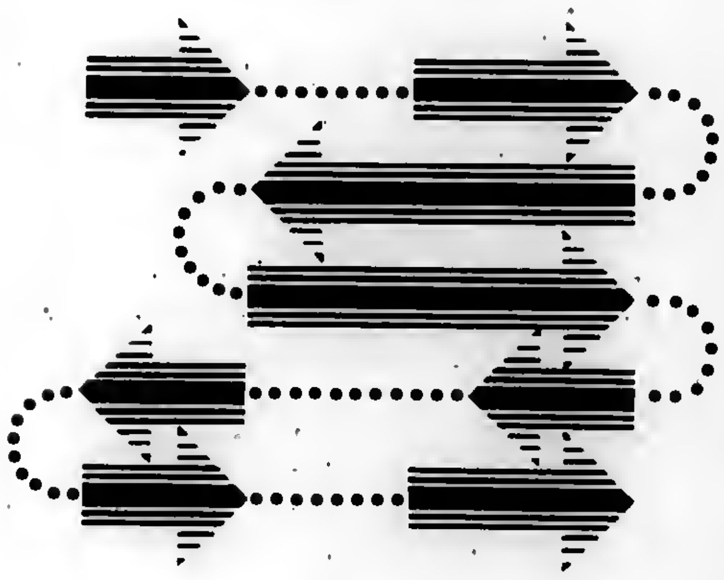
*HP's implementation of IEEE Standard 488-1975 "Digital Interface for Programmable Instrumentation," and identical ANSI Standard MC 1.1.

clear, and readable—even on the sixth sheet of a multiple-part form.

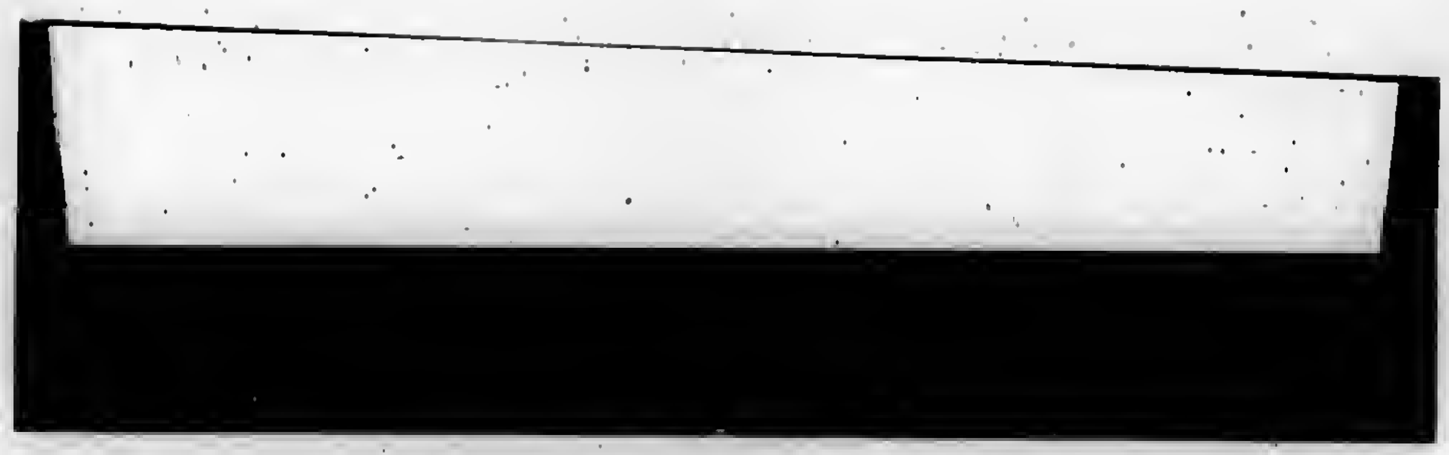
The HP 2631 is bilingual, supporting two full character sets (one standard, one optional), and can intermix the two on any one line. Alternate sets so far include Swedish/Finnish, Spanish, French, German, Norwegian/Danish, and British.

High throughput

Consider the path taken by the print head. It is bi-directional, fast, and determined by a "smart printing" algorithm that selects the optimal path and speed. By the time one line is printed, the next several lines have been processed and stored in a buffer. Leading and trailing spaces have been detected and ignored—the head moves directly to the first character of the next line to be printed. When ten or more adjacent spaces have been detected within a line, the head speeds to the next printable character at an accelerated rate of 450 cps, a major time-saver when printing tabular data.



The HP 2631/2635 choose the most efficient direction (left-to-right or right-to-left) for the print head to move. Smart, bi-directional printing can increase throughput as much as 50%.



A sixty yard, inky, mobius strip has been packed into this cartridge for quick, convenient, and clean insertion into the HP 2631/2635 printers.

Design and mechanical simplicity

The HP 2631/2635 are simple and modular in design, removing some of the hassle and cost often associated with printer ownership. The number of mechanical parts has been reduced to lessen the probability of breaking down and wearing out. One servo-motor, for example, drives both the print head and ribbon cartridge. To improve serviceability, boards plug in and pull out quickly. Loosen only six screws to ready the printer for repair.

Trouble-free ownership

Both printers are adjustment free. The chassis is factory-adjusted and "sealed" for life. The nine-wire, ballistic, print head is a simple, dynamic system which self-aligns and can be easily replaced.

The printers are clean—you'll never touch an oil can again since key moving surfaces are a teflon-based material. When changing the ribbon cartridge, you'll never touch the inky fabric.

The inexpensive, trouble-free cartridge ribbon also shows the designers' concern for mechanical reliability. The cartridge employs a mobius loop, which allows full surface use of the ribbon and ensures that printing is always on a fresh part of the ribbon. The ribbon normally needs changing only after 10 million characters. The print head is also conservatively rated at 100 million characters.

The HP 2630 family is designed with user convenience in mind. Additional features include a self-test capability that assures you the printer is operational. Pedestal and desk-top versions blend into office environments.

Mechanical simplicity, long-life parts, and no adjustment—all contribute to ease of use and low cost of ownership.

These printers are ideal output and/or input devices for HP and other computers, calculators and CRT terminals. Interfacing is via RS232 (CCITT V.24) and 20mA current loop options on the HP 2631/2635, plus differential I/O, 8-bit parallel TTL, and HP-IB* options on the HP 2631.

The U.S. price for the HP 2631 printer is $3150 and $3450 for the HP 2635 printing terminal. OEM discounts are available.

It is difficult to reproduce here the quality print produced by these printers. **Request a live demonstration or more information by checking "B" on the reply card.**

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*The Hewlett-Packard Interface Bus (HP-IB) is Hewlett-Packard's implementation of IEEE Standard 488-1975, "Digital Interface for Programmable Instrumentation."

Continued from page 2

engineering. Typical industrial applications range from monitoring offshore oil drilling to counting and routing wine bottles.

Decouple and delegate

The HP 2240 has the innovative ability to decouple automation tasks from the computer. Timing, scanning, event synchronization, formatting, and interrupt tasks can all be delegated to the HP 2240.

One-line programs

An extensive set of high-level measurement/control commands is another innovation. Users delegate tasks with one simple program statement. Requests to perform a task are generated by write or print statements in familiar BASIC, FORTRAN, HP Assembly, or HPL languages, as shown on page 2. The HP 2240 stores the instructions in memory and executes them in sequence, without further computer interaction.

Self-test

Part of the HP 2240 microprocessor design is self-test. Built-in ROMs and a separate self-test fixture allow users to run off-line diagnostics. This feature can lower repair costs and speed installation.

The HP 2240, with a typical mix of analog and digital I/O cards, costs about $6,000. High performance automated test systems based on the HP 2240 range from $10,000 to $27,600. Volume discounts are available. (U.S. prices only.) **Check A for details.**

A million-in-one

A million bytes in one small box. That's how much memory Hewlett-Packard now packs in the "megabyte computer"—one million bytes of "fault control" memory in a 12¼ inch high HP 21MX package for only five cents a byte. Through the use of a memory extender, memory capacity for HP 21MX systems can be increased even further to a total of 1.8 megabytes.

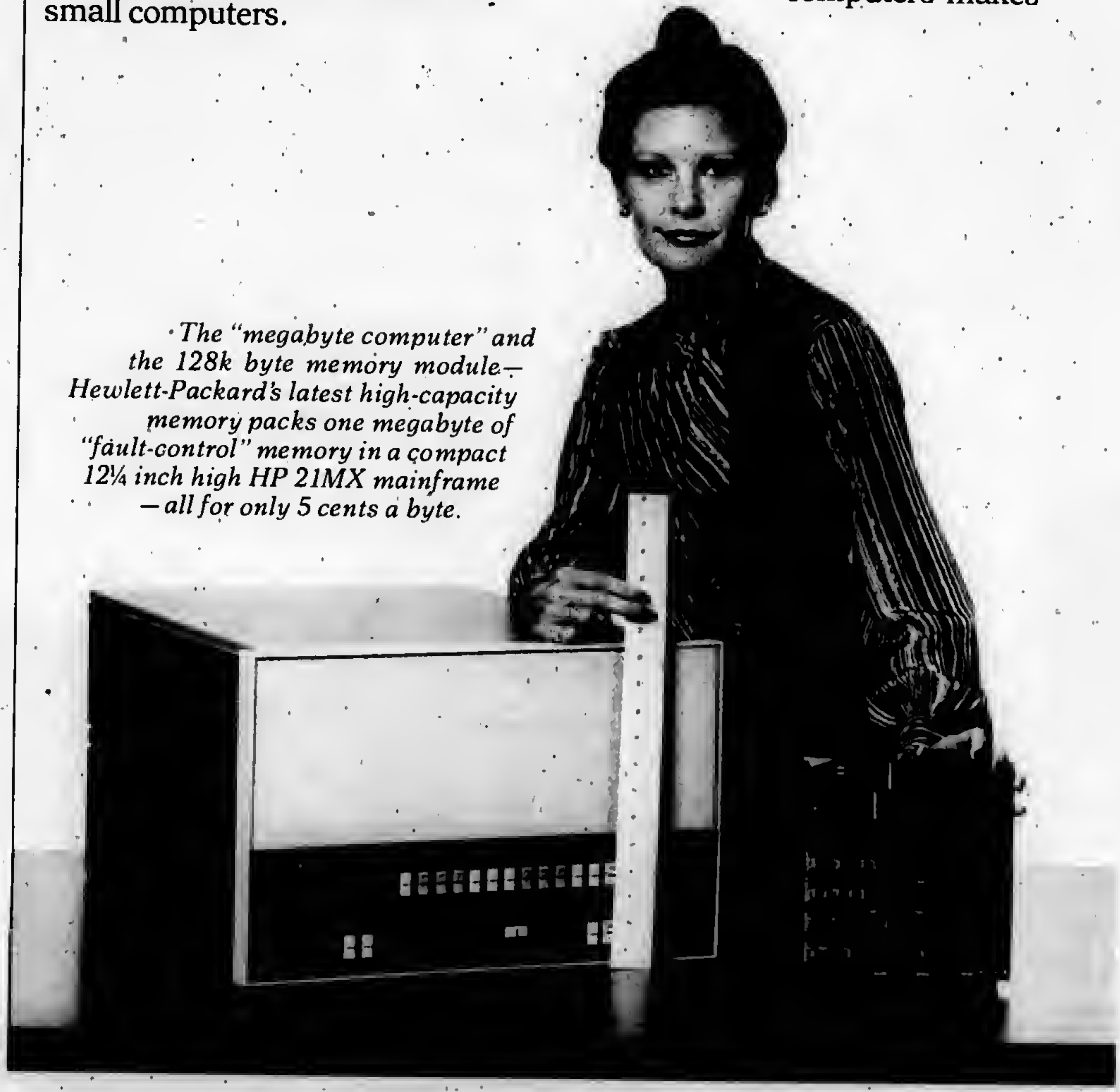
Increased density was made possible by a new 128k byte memory module based on 16K-bit, N-Channel, MOS/RAM memory chips—the first in use by a major manufacturer of small computers.

Better throughput

The expanded memory system is especially suitable for real-time, multiprogramming applications where high throughput is critical; for example, high-speed data acquisition and process control. With a megabyte or more of programs resident in memory, the delays inherent in swapping to and from a disc are eliminated.

HP gives you a bit more

The increasing popularity of large memories in small computers makes



The "megabyte computer" and the 128k byte memory module—Hewlett-Packard's latest high-capacity memory packs one megabyte of "fault-control" memory in a compact 12¼ inch high HP 21MX mainframe—all for only 5 cents a byte.

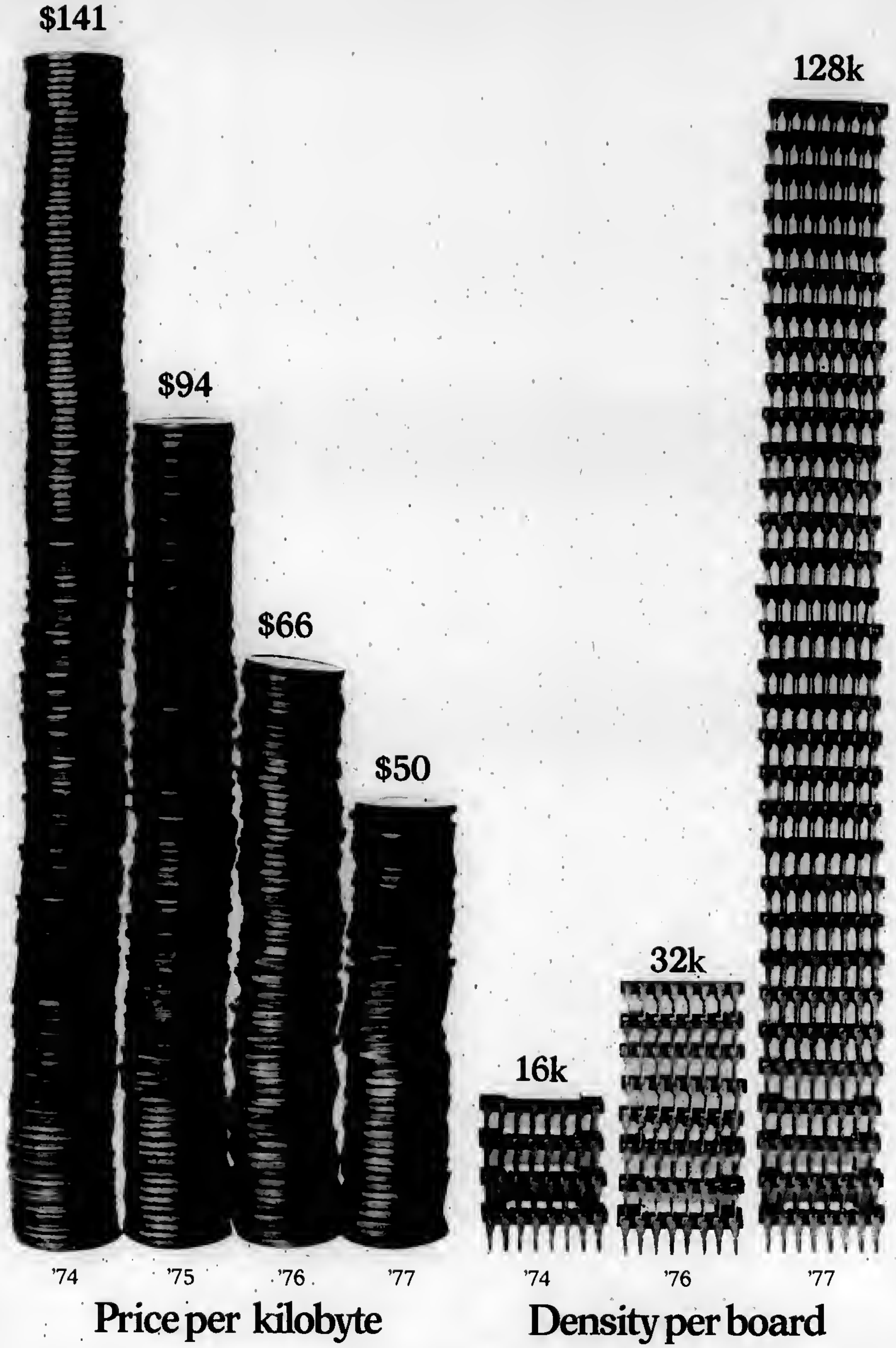
memory reliability a major contributor to overall system reliability. Recognizing this, Hewlett-Packard also introduced a new "fault control" capability, which provides for detection and correction of all single bit memory errors. This is accomplished through use of a standard 21-bit Hamming code. But, HP goes one bit further.

There is always the remote chance of a double bit error. We added a 22nd parity bit to the Hamming code, enabling us to detect all double bit errors. Programs will continue running and data will be protected even if a memory chip malfunctions.

The new "fault control" system is expected to provide a significant improvement in Mean Time Between Failure (MTBF) of basic HP 21MX memory modules. This is especially important to large memory systems. For example, we would expect an MTBF of roughly one year, without the probability of a failure on the "megabyte computer." Memory stays operational so maintenance can be performed on a scheduled rather than emergency basis.

When there's dirt in the air...

Memory-based systems, as you will read in the next article, can tolerate "unfriendly" environments. Such systems are excellent for remote, unattended locations where reliability is critical; for example, on offshore oil platforms, on shipboard, or in planes. The go anywhere, "megabyte computer" is ready to work without the need of air conditioning, elevated floor, or lots of space.



Since Hewlett Packard's early commitment to semiconductor memory, we have been able to bring customers memory price decreases at an average of 30% a year, and memory density that has gone up and up. The most recent HP 21MX memory system using 16k RAMs quadruples memory board capacity from 32k to 128k bytes.

A nickle a byte

Density and reliability are not the only advantages of semiconductor memory. Cost savings is another. The new 128k byte memory module is priced at $6,400 (U.S. prices only)— just five cents a byte. "Fault control" memory is optional and available as a controller and associated check bit arrays. Existing HP 21MX customers can easily upgrade to larger memories.

More information on HP's large memory system is available. **Just respond to C on the reply card.**

Think big, even if you start small

With RTE-M, Hewlett-Packard's new real-time operating system, you can use big memories. RTE-M, software for HP 1000 and 21MX computers, can handle HP's memories up to 1.8 million bytes. But, you can start a system with as little as 32k bytes of memory.

M is for memory

RTE-M is memory-based, which ensures extremely rapid response time, within hundreds of microseconds. All system software and user programs are resident in main memory where they are instantaneously available for execution. There are no time delays caused by transferring programs in and out of main memory.

Good response time is further assured by a user-defined, flexible scheme for assigning priorities. Tasks are executed according to their specified priority as computer time becomes available. A time-critical program is guaranteed full and immediate computer attention and is run at optimum speed.

Flexibility further distinguishes RTE-M: it comes in three modular versions. Each customer chooses the tailored version that best matches his or her requirements. There's no hardware and software overhead.

The simplest system configuration supports a single terminal with 32k to 64k bytes of main memory. Intermediate systems support multiple terminals, 48 to 64k bytes of memory, and full real-time, multiprogramming. The high-capacity system offers all the features of the above two, can manage up to 1.8 megabytes of memory, and interacts concurrently in BASIC, HP Assembly, or FORTRAN. A dual density flexible disc is also available.

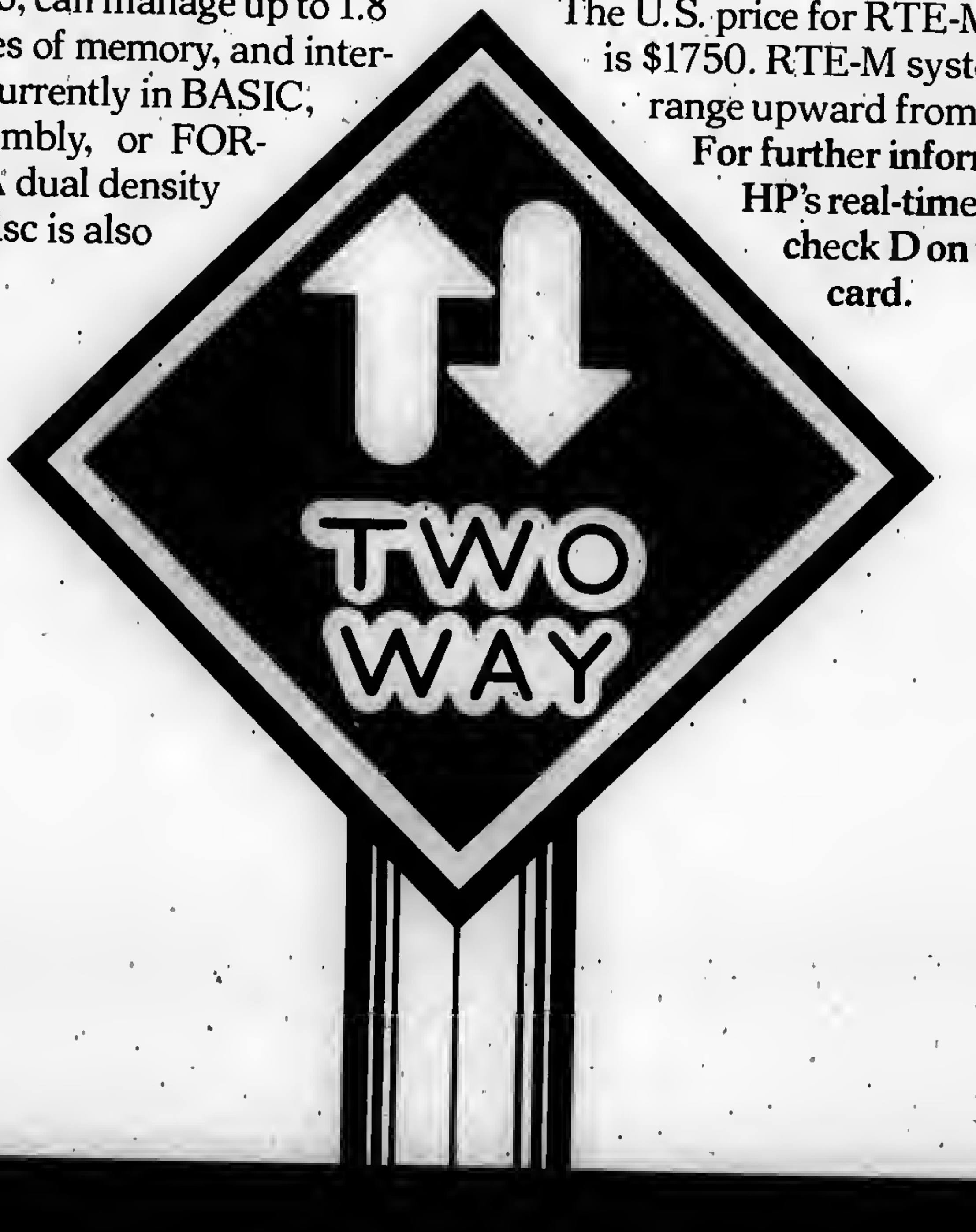
A two way street

All members of HP's RTE family—RTE-M, and disc-based RTE-II and III—are compatible. RTE designers went to great lengths to ensure that in terms of the programmers' and operators' interface-system prompts, operator commands, programmatic calls, and error messages are identical for all versions of RTE.

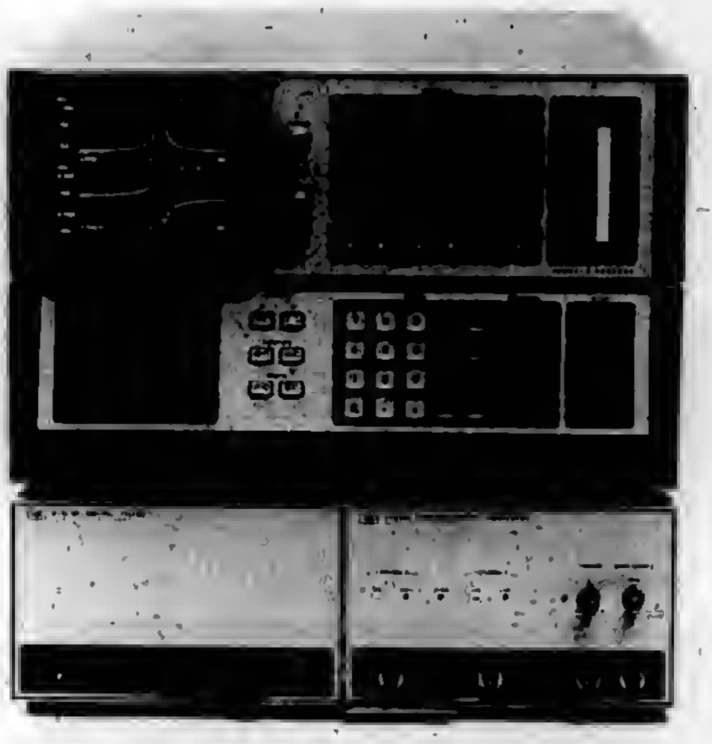
Program statements of the operating system and the file manager are alike; program transportability is assured within the three RTE-M versions. Transporting programs, in either direction, between RTE-M, RTE II, or III requires only minor, if any, changes. It is like a two way street. Upgrading is simple, as is adding multiple small systems supported by a larger program development system.

The U.S. price for RTE-M software is $1750. RTE-M systems range upward from $21,000.

For further information on HP's real-time systems, check D on the reply card.



New & Noteworthy



Can you find the computer in this photograph?

21MX K-Series computer components are being "buried" alive at HP

The Santa Clara, California instrument division integrates the K-Series into its own products because the "K" offers the high processing power and microprogramming capability of 21MX computers in component form, on a single, low-cost board.

The K-Series is at the heart of the HP 5420 digital signal analyzer, which accurately measures signals associated with noise and vibration. HP 5420 applications include analyzing the dynamics of structures from bridges to automobile frames, measuring spacecraft noise levels, and studying aircraft wing vibrations.

With K-Series intelligence, the HP 5420 is totally interactive, allowing users to set up, display, and control all measurements from a clearly defined set of front panel keys. During measurement set up, for example, operators press a key and a menu appears on the screen, listing all possible measurement functions. This assists even inexperienced operators in making the correct measurement selection. Operators spend less time setting up a measurement, and more time analyzing results.

The HP 5420 performs three basic tasks in every measurement application, as described below. Embedded in the HP 5420, the "K" provides the speed, power, and flexibility necessary to accomplish them.

Task one

Sample one or more analog signals and convert them to digital signals.

High direct memory access rates are essential in performing these analog-to-digital conversions. The K-Series is a high-performance, 16 bit minicomputer with a 650 nanosecond cycle time—many times faster than traditional microprocessors. Also, the "K" board's flexibility makes it easy for OEM's to add an extended arithmetic processor board for even faster data manipulation.

Task two

Compute the desired measurements on the signals and store them in memory.

The advanced algorithms critical to these measurements require speed, memory, and computational capability well beyond a simple microprocessor...or even most minicomputers. The "K" board contains a full 24 bit microprocessor with which OEM designers can easily microcode specialized routines into read-only memory, where they can be permanently stored.

Task three

Display results on the CRT screen, plot, or process them further.

Because of the computational capability of the "K," measurement results are shown simultaneously, while the analyzer is still performing fast data acquisition. Further analysis is provided using pre-programmed post-measurement operation, and results can be stored on a removable tape cartridge.

The HP 5420 digital signal analyzer is priced at $29,900. The 21MX K-Series board costs $1475 and can be volume-discounted. (U.S. prices only). **Check E and F on the card if you wish more information.**

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Tektronix 4025 CRT Turns Alphanumerics to Graphics

BEAVERTON, Ore. — A raster scan CRT terminal which displays alphanumerics but also converts that data into graphics has been introduced by Tektronix, Inc.

The Model 4025 reportedly uses a data storage technique dubbed a "virtual bit map" in which alphanumerics and graphics are referenced in the same display list, but stored separately in read-only memory and random-access memory and random-access memory respectively.

When the terminal's controller scans its display list, it summons the alphanumerics and graphics as needed from their respective memory locations, Tektronix said. This method allows users to scroll alphanumeric and graphics data together on the terminals' CRT screen, according to the company.

Tektronix characterized the 4025 as the first raster scan CRT terminal to integrate alphanumeric and graphics data in this way.

One of the advantages of the virtual bit map technique is that it allows the terminal to make 8.5- by 11-in. hard copies of its alphanumeric and graphics data on a Tektronix 4631 hard-copy unit.

The product also connects to Tektronix's 4662 plotter and to the firm's 4924 digital tape recorder, a spokesman said.

Links to Hosts

Based on a Motorola 6800 microprocessor, the 4025 was designed not as a stand-alone unit, but as an interface to host computers, with which it communicates at 9,600 bit/sec, according to the spokesman. A standard 4025 provides an RS-232 full-duplex interface; an RS-232 half-duplex interface is optional.

The terminal's screen, which consists of a workspace for graphics and a monitor area for user-computer communications, measures 12 in. diagonally and holds 34 lines of text with 80 char./line, Tektronix said.

The standard character set reportedly includes 64 lower case and 96 upper case Ascii characters in an 8 by 14 dot matrix.

The 4025 typically holds a 4K-character display memory expandable to 8K, 16K and 32K characters, the spokesman added. Line frequency ranges from 49- to 61 Hz and power consumption is 295W maximum at 125Vac.

Equipped with a standard typewriter keyboard rather than an Ascii layout, the terminal provides 16 function keys along the top of the keypad and 12 number keys along the side.

In the usual operating mode, the 12 number keys control the 4025's cursor; in the numeric lock mode, they form a numeric pad for data entry, the company said.

Typical keyboard editing functions include line delete, character delete, line insert and character insert.

Software provided with the terminal includes the Plot 10 package, which Tektronix said allows users to turn data files into bar graphs, histograms, line graphs and pie charts.

The 4025 costs $3,595 ($3,307 in OEM quantities) and leases for $189/mo on a one-year contract. Deliveries will begin Nov. 21 from Tektronix's Information Display Group, P.O. Box 500, Beaverton, Ore. 97077.

No Graphics

BEAVERTON, Ore. — Tektronix's 4025 represents just one of two recent additions to the company's 4020 terminal series. The other newly introduced terminal — the 4024 — is identical in most respects to its sister product.

Unlike the 4025, however, the 4024 displays alphanumeric data only, Tektronix explained.

A standard 4024 costs $2,995 ($2,755 in OEM quantities) and leases for $157/mo on a one-year contract.

Data Set Unveiled

ESCONDIDO, Calif. — A multispeed synchronous data set for local metallic telephone circuits has been announced by the Teleproducts Division of Designed Enclosures, Inc. (DEI).

Designated SDT-1, the unit is strap-selectable to operate at 2,400-, 4,800- and 9,600 bit/sec and 19.2 kbit/sec. It operates over four-wire, full-duplex dc metallic circuits and is reportedly capable of operating at a distance of 15 miles over unloaded cable.

The set costs $395 from DEI at 563 N. Citracado Parkway, Escondido, Calif. 92025.

Datotek Designs Encryption Unit

DALLAS — A portable, self-contained, desktop electronic encryption unit has been announced by Datotek, Inc.

Designated the DC-26, the unit is compatible with the company's recently announced DH-26, a handheld calculator-like enciphering device. With a full-size keyboard and thermal page printer, the DC-26 is said to provide rapid data entry plus hard copy output.

The DC-26 can be used as a central or base-station encryption unit, a spokesman noted.

Operation of the DC-26 requires no special experience, Datotek said.

As the operator keys in the message to be enciphered, the data is first displayed, scrambled in five-character groupings and then printed after the sixth character is entered, the firm said. Text corrections can be made.

Datokek's proprietary key generator is said to provide an almost infinite number of user-selected key variables, making the possibility of unauthorized interception remote.

Display is a 16-segment, LED alphanumeric type. The DC-26 utilizes a thermal 5 by 7 dot matrix printer with a maximum line length of 80 characters and prints 30 char./sec.

The basic unit is priced at $6,800 from Datotek at 13740 Midway Road, Dallas, Texas 75240.

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Microwaves Sept. 1976

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Copies of *How to Create a Winning Proposal* are available pre-paid from Mercury Communications, Inc. 730-G Mission St., Santa Cruz, CA 95060. $65 includes 3-5 day delivery inside the U.S. In California add $3.90 tax. For outside the U.S., $76 (int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

From Facsimile to Conferencing

Diversity of Electronic Mail Systems Examined

By Ronald A. Frank
CW Staff

LOS ANGELES — Electronic mail systems are already feasible from a technological standpoint and several of these systems are already in operation, according to panelists at the Interface West conference here recently.

Einar Stefferud, president of Network Management Associates, Inc. said electronic mail is used to define a variety of systems. The term is applied to networks ranging from facsimile systems up to full computerized conferencing systems.

Facsimile systems are analog connections and include terminal-to-terminal communications. They allow picture image transmission and the sending of signatures, but electronic retention of the information is difficult.

Direct-wire teletypewriter systems are digital and add character code transmission. But these cannot transmit drawings or pictures and they require keyboarding and printing in order to be readable. Electronic retention is also difficult, he said.

Teletypewriter message-switching systems are next in order of sophistication and these feature store-and forward transmission of messages from terminal to terminal. These also require keyboarding and printing, but electronic retention of the information is still difficult.

A step more advanced are computer message systems using time-sharing systems connected to remote CPUs. These allow intracomputer file-to-file text transfers so long as the sender and receiver terminals are connected to the same CPU, Stefferud said. These systems require training, specialized equipment and software but they introduce the concept of computer processing of messages.

Computer network message systems operate within a network of computers and allow intercomputer file-to-file text transfers. These also have a requirement for training users and need specialized equipment and software. However, they add the dimension of a large connected community, he said.

Conferencing Systems

The most sophisticated electronic mail systems are the computer conferencing systems that have common shared message file access. These support group discussions but also require user training, Stefferud noted.

An example of the latter type of system has been operating on the Arpanet for some time. Called Message Group, this informal teleconference was designed to explore the potentials for computerized message systems in addition to defining what form these should take.

Experience with this system has determined that electronic mail systems can be broken down into four basic categories, Stefferud said. The first is concerned with preparation and modification of the information.

Next, the question of packaging and delivery of the text must be examined. This involves building an envelope structure within which the transmitted information can travel. This category is also concerned with information addressing and includes the creation of electronic mailboxes for conference participants.

Packaging and delivery also includes provision for the transmission of data and failure indications when information is not sent correctly. In cases of network malfunction, rerouting must also be provided for.

On the receiving end, there has been a difference of opinion on the need for acknowledgement of messages, Stefferud said. Some believe that this is necessary for participants to know that a message has been received by a certain party, but others feel that an acknowledgement implies a need for an answer and thus is not necessary.

CW at Interface

Authentication of messages as being from authorized parties has been a controversial issue as well as whether or not a public archive of transmitted messages should be established. If such an archive is kept, the question of ownership of the information will also have to be studied, he said.

The third category is concerned with filing and retrieval of messages and includes file sharing and purging if that is to be a goal. The fourth category leads to the creation of data banks although these are not technically part of the electronic mail problem directly, Stefferud said.

In response to a question from an attendee, Stefferud admitted that the question of security had been left off the list. In general, it is often more important to know that the system has been compromised rather than to try to prevent it from happening. If a compromise is discovered, measures can be taken to minimize its impact, he explained.

Experience with electronic mail systems proves that there is still a need for human interaction, however, Stefferud said. In cases where there have been serious disagreements between electronic mail participants, it is not unusual for someone to pick up the phone and talk directly to the other party out of sheer frustration, he said.

Often, text loses the marginal contexts that can only be captured during actual voice conversations. When this occurs, the parties may actually experience a divergence of understanding that can ony be solved by talking directly, he explained.

Several attendees asked when electronic mail systems will become more widely available. The heart of the issue is a need for timely man- or machine-readable communications, according to Robert Field, vice-president of Tymnet, Inc.

The On Tyme service introduced by Tymnet allows terminal-to-terminal communication of messages on his company's network, he said. The service transmits 500- to 1,000-word messages for between 20 cents and 80 cents depending on terminal type and geographic location, he said.

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Citibank Reported Running Private Packet Net

CW at Interface

By Ronald A. Frank
CW Staff

LOS ANGELES — A private packet-switched network has been put into operation by Citibank in New York, according to Seymour Ratner, assistant vice-president.

Speaking at a session on data switching networks at the recent Interface West conference here, Ratner said the packet net is called Citinet and is based on technology used in the Arpanet.

Citinet has been operational since March and is presently being used for management information systems applications connecting various mini-based systems developed by the bank. Ratner said that he could not disclose the number of processors operating on the packet net but that included are minicomputers from Honeywell Information Systems, Digital Equipment Corp., and Interdata Corp.

Software for Citinet was developed with support from Bolt Beranek and Newman, which developed Arpanet software for the Department of Defense. Although much of the Arpanet software is in the public domain, some modifications were made to handle the Citinet operations.

The private packet net uses an RS-232 electrical interface together with character-stuffing (instead of bit-stuffing) principles, and its link protocol is based on the Higher-Level Data Link Control (HDLC) format found in the CCITT X.25 standard. Some changes were made to the HDLC protocol for Citinet, Ratner said.

Current Use

At present, the packet net is being used only for host-to-host data transfers, but terminal-to-host and terminal-to-terminal capabilities are being considered, he added.

Using the minicomputers, it cost about $25,000 to add a new processor node to the network compared with much higher costs in other packet nets such as Arpanet where the packet technology was developed. Software interfacing to support a specific type of minicomputer on Citinet costs about $75,000 per machine type, Ratner said.

Session chairman Ralph Berglund, a consultant, said the Citinet is typical of the way in which private networks will apply the virtual circuit switching techniques now emerging. These nets will extend the distributed data base and distributed processing concepts to allow multiple terminal and multiple host communications, he said.

The recent CCITT adoption of X.25 will lead to "substantial international development of an expansion of public virtual-switched circuit networks in the coming years," according to Berglund, and as evidence he cited IBM's introduction of an X.25 interface for the 3270 CRT system for the Datapac network in Canada and the Transpac network in France.

Vendor's network architecture such as IBM's Systems Network Architecture, DEC's Digital Network Architecture and Univac's Distributed Communications Architecture — should be related to the public data networks, Berglund said. Both the public nets and the architectures are part of a new era in virtual circuit switching systems, he noted.

Although most of the announced network architectures are designed for virtual circuit switching, the NCR Distributed Network Architecture "seems to provide for both virtual circuit and datagram interfaces," he said.

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Human Factors Held Vital to Control Centers

LOS ANGELES — Human factors are an important part of a technical control center designed to monitor the performance of data communications networks, according to John Nuwer, supervisor of data transmission for Atlantic Richfield Co. (Arco).

Describing the switched private coast-to-coast network operated by Arco in the continental U.S. and Alaska, Nuwer said that the carrier must take responsibility for network diagnostics and maintenance.

Technical control centers must not be built on such a complex level that they exceed the capabilities of the people that will be monitoring and staffing them, he said.

In this regard, it is often wise to make a distinction between the information needed by the computer operators and that needed by the communications maintenance people. Computer operators are only interested in knowing whether a terminal is in operation and they don't need technical equipment to monitor such parameters as phase jitter.

Patch panels that allow individual lines to be monitored should be installed in technical control centers, where communications technicians can monitor exactly what is happening on a particular line, Nuwer said.

Interface Monitor Portable

PROVIDENCE, R.I. — A portable, rechargeable version of the Model 60 EIA interface monitor and breakout panel is being offered by International Data Sciences, Inc.

Featuring two AA nickel-cadmium batteries that allow the unit to operate from 110 VAC while the batteries are being charged, the test set provides access to all 25 conductors of the EIA RS-232 interface, the firm said.

Twelve LEDs monitor signals and two LEDs sense whether signals meet EIA specifications, according to a spokesman.

Twenty-four switches allow all interface conductors except frame ground to be individually interrupted, allowing isolated testing and observation of terminal and modem signals, he said.

The unit sells for $250 from International Data Sciences, Inc., 100 Nashua St., Providence, R.I. 02904.

CRT Aids Development

PHOENIX — A CRT terminal designed for use with the Exorciser development system was unveiled by Motorola Semiconductor Products, Inc.

The Exoterm 100 provides communications through a keyboard at rates up to 9,600 bit/sec. A video display that uses a 12-in. diagonal CRT provides response within 24 lines of up to 80 characters each, it was reported. All activities are coordinated by a micro-executive module in conjunction with various control and application modules.

Efficiency is enhanced by 12 function keys that are reportedly encoded to directly invoke functions to the Exorciser at each of its three command levels. Communication between the terminal and the Exorciser system is provided by an RS-232C interface.

The price of the terminal is $2,200 from Motorola Semiconductor Products, Inc., P.O. Box 20294, Phoenix, Ariz. 85036.

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Self-Study Program Teaches Data Entry Skills

MINNEAPOLIS — A self-study multimedia course that teaches data entry skills to key-entry operators is available from Data 100 Corp.

The course consists of two audiotapes, an administrator's guide, an operator's guide and a reference guide. It covers operations of both the company's Keybatch key-to-disk and Model 77 key-to-diskette systems.

Operators can go through a series of audiotape lessons, workbook activities, hands-on exercises and self-evaluation procedures at their own speed. The entire process takes six to eight hours, Data 100 said.

The course is priced at $148 from Data 100 at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

Floor Mat From 3M Drains Static Charges From Personnel

ST. PAUL, Minn.— An electrically conductive floor mat which drains static charges from office personnel has been introduced by the 3M Co.

The Velostate forms an "island of protection" around computers and electronic office equipment, preventing loss of data and alteration of memory, the firm said.

Each mat comes in three sizes: 24- by 32 in., 4- by 5 ft. and 4-by 8 ft. They cost $30, $95 and $105 respectively from 3M at P.O. Box 33600, 3M Center, St. Paul, Minn. 55133.

Graphics Meet Set

WAUWATOSA, Wis. — Jerusalem Systems here has announced a computer graphics seminar to be held Dec. 14 and 15 in Milwaukee.

Computer Graphics '77 will be run on four tracks, covering the industrial, business, government and utility computer graphics applications.

The cost of the seminar is $400 from the firm at 12201 W. Burleigh Road, Wauwatosa, Wis. 53222.

Correction

Media Recovery, Inc.'s automatic impact detectors [CW, Oct. 24] cost $6 in quantities of one to 12. The $2.50 price applies to OEM quantities of 100,000 or more.

Burroughs Corp. B9138

Micr Reader/Sorter Processes 2,600 Check/Min in One Pass

DETROIT — A magnetic ink character recognition (Micr) document reader/sorter that reportedly can process 2,600 standard checks per minute and 131,000 encoded forms of mixed sizes in an hour has been introduced by Burroughs Corp.

The B9138 can read, endorse, microfilm and sort Micr-encoded documents in a single pass, the firm said. The system functions on-line under control of a central computer or off-line with its own internally stored programs, a spokesman noted.

On-line, the B9138 can be used with a B2800 or larger member of the Burroughs 800 family or with B3700 and larger computers in the 700 series.

The unit can be equipped with four to 32 sorting pockets in four pocket modules; each pocket is capable of holding up to 950 documents, the spokesman said. The system has 16,000 bytes of user memory expandable to 44,000 bytes.

Document-processing programs are loaded into the B9138 memory through its own 243,000-byte minidisk. Programs can be created, however, from the console keyboard, Burroughs said.

System features include bulk filing to facilitate retrieval, a built-in "jogging" mechanism for document alignment, electronic image tracking and double reading of each character.

System-to-operator messages in English and corrective-action instructions appear on the control console and on swivel-mounted

(Continued on Page 60)

DP Insurance Can Be Tailored

SAN FRANCISCO — Fireman's Fund Insurance Co. is offering a DP policy it said can be tailored by users to suit their operations.

The policy offers "all-risk" coverage for physical damage to equipment and tapes, cards and other forms of media. It also offers business interruption and extra expense coverage, Fireman's said.

This makes it possible to adjust the DP policy to the needs of those users with only a few terminals as well as those with more elaborate computer installations, a spokesman explained.

Physical damage coverage can be either on an actual cash value or on a replacement cost basis, he added. Separate limits can be established for owned, rented and leased equipment.

Coverage also includes dishonest, fraudulent or criminal acts of employees, he noted.

Extra expense coverage includes indemnification for use of outside DP equipment, additional payroll, emergency supplies and rental. The actual amount of loss less the deductible is paid at the policyholder's option.

Information about the DP policy can be obtained from Fireman's Fund at P.O. Box 3395, San Francisco, Calif. 94119.

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Systems Offer Continuous Measurement

McLEAN, Va. – A series of performance management systems that are said to continuously measure system profile, buffer hits and misses, and millions of instructions per second (Mips) on IBM 370/168, Amdahl Corp. 470V/6 and Univac 1110 computers has been announced by Tesdata Systems Corp.

Composed of five models (the MS-58C, MS-88A, MS-88B, MS-88C and MS-88D), the Alpha systems provide continuous measurement through real-time displays and report generation as system abnormalities occur, according to a spokesman.

This continuous measurement concept also provides an additional dimension to multisystem and/or decentralized data processing users through the availability of Distributed Measurement Networks.

These systems may be geographically disbursed and connected through standard communications interfaces to provide a centralized base of performance information.

Each Alpha system also operates on a foreground/-background principle via the Tesdata disk operating system. Performance measurements are stored on a disk in the foreground, while system planning and trend reports are generated in the background.

An Alpha MS-88D with a 144-sensor data collection system can monitor the number of bytes transferred on all the previously mentioned CPUs, all channels and/or all devices as well as bytes transferred on up to 16 transmission lines including line retrieve and polling measures.

The Alpha series systems, including all support, training, documentation and software, range in price from $115,000 to $178,000, Tesdata said from 7900 Westpark Drive, McLean, Va. 22101.

Biomation Introduces Portable Logic Analyzer

CUPERTINO, Calif. – Biomation Corp. has introduced a portable logic analyzer that is said to be suited for the individual engineer's use in equipment design and for use in field testing by service personnel.

The 9-channel Biomation 920-D plugs into any available oscilloscope or CRT, a spokesman noted.

Other features include an auxiliary channel, a clock or event trigger delay, a 20 MHz record rate, combinational triggering and a 10 nsec "glitch" detection feature.

The unit's memory capacity is 9 bits by 256 words, using static random-access memory (RAM), the spokesman said.

The auxiliary channel can be used to record data as a conventional signal input channel for subsequent display; to mark and qualify trigger points; and to qualify the external clock input.

The unit records in two modes; one records until a trigger event is hit, the other records until a preset time after the event.

The unit stores both pretrigger and post-trigger data.

The 920-D is available for $1,295. Biomation Corp. is located at 10411 Bubb Road, Cupertino, Calif. 95014.

OCR-A Imprinter Available

PHILADELPHIA – Soabar, Inc. has introduced an OCR-A imprinter, the Model 341, which features a dial-set band head designed for quick copy changes and machine setup.

The machine's printband head permits dial setting of copy in either optical character recognition (OCR) characters, conventional characters or a combination. It provides four dial-set bands of copy maintaining up to 10 band/line, a spokesman said.

The Model 341 also incorporates a slide-in magnetic chase to hold metal-based, rubber mats for the imprinting of repetitive copy such as size, color and style.

Other features include a three-roller inking system, a positive feeding mechanism, two feed fingers, a self-stop counter and a flexible lamp for visibility when setting copy on the printband head.

The units sells for approximately $4,200 from Soabar at 7722 Dungan Road, Philadelphia, Pa. 19111.

NCS Brings Out Optical Mark Reader/Recorder

MINNEAPOLIS – National Computer Systems, Inc. (NCS) has introduced an optical mark recorder/-reader designed for commercial and governmental use.

The Sentry 7005 can read and record nearly 7 million items of information from 2,400 reponse sheets every hour, NCS said. Because it eliminates the entire keypunch operation, the system can save data entry and processing time and money, a spokesman claimed.

The 7005, which features self-calibrating read heads and an automatic deskewing mechanism, handles a variety of forms, the spokesman added.

The recorder/reader is available in both stand-alone and on-line models. The on-line version feeds information directly to a host mainframe; the stand-alone model puts the information onto a standard reel-to-reel tape for future processing.

Options include a sorter that selects mismarked response sheets and a printer that encodes or abstracts information.

The Sentry 7005 is available for $49,500 from NCS' Equipment Division, 4401 W. 75th St., Minneapolis, Minn. 55435.

Micr Unit Out

(Continued from Page 57)

CRTs, with one CRT for each group of eight sorting pockets.

Visual indicators on the pocket stackers guide the operator in recovering a jam or missort, the firm said.

Purchase prices for the B9138 range from $226,500 for a basic four-pocket system to $593,700 for a 32-pocket system equipped with an ink-jet endorser and a microfilming module. The system will be available in the fourth quarter of 1978, Burroughs said from headquarters in Detroit, Mich. 48232.

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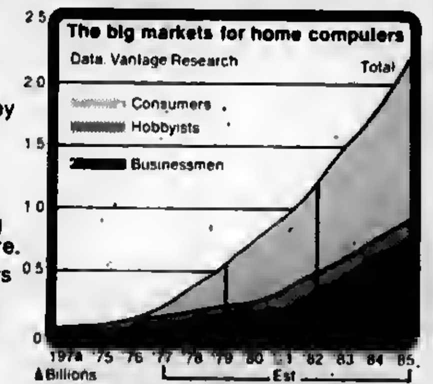

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NMA Publishes COM Resources

SILVER SPRING, Md. — The National Micrographics Association (NMA) has expanded its offerings with the printing of four publications.

All About Microfilm Cameras covers the elementary principles of photography and film, microfilm facts and terms, microfilm cameras and accessories and maintenance of cameras. The 28-page booklet, designated CS6, is available for $2 per copy.

The *1977 Supplement to the Guide to Micrographic Equipment* covers computer output microfilm (COM) equipment introduced since the last supplement was published in 1976. The publication is designated RS23-1977 and sells for $14 to NMA members and $17 to nonmembers.

Basic Microfilm Standards, MS115-1977, deals with Internal Revenue Service standards which cover the microfilming of general books of account. Actually a collection, this publication sells for $8.50 to NMA members and $11 to nonmembers.

The *British Standard Specification for Microfilm Readers* specifies the characteristics of reading apparatus for microfiche and for microfilm in roll form, filmstrips, aperture cards and jackets. Included with the standard is a high resolution test fiche with 3,360 chart images at a reduction of 100X.

The package, BS 4191, is available at $18.50. The test microfiche alone, designated BS4191C, costs $12.50.

All publications can be ordered from NMA Publication Sales, 8728 Colesville Road, Silver Springs, Md. 20910.

Light Pens Bow

LOS ANGELES, Calif. — Two solid-state light pens, the LP-210 and the LP-211, have been introduced by Information Control Corp.

Each light pen is 6 in. long and weighs 2 oz.; each features a satin chrome finish and a retractable 48-in. cord, according to the company.

The LP-210 has a "Touch-Sense" actuator tip which is activated when the operator's index finger touches the pen's barrel. The LP-211 is fitted with a push-actuation tip that is enabled by pushing against the CRT faceplate, the firm said.

Prices for the LP-210 start at $450 and $475 for the LP-211, International Control said from 9610 Bellanca Ave., Los Angeles, Calif. 90045.

Zeta Cuts Cost Of Drum Plotters

LAFAYETTE, Calif. — Price reductions ranging up to 19% on its 12-in. drum plotters has been announced by Zeta Research.

Previously $4,950, the Model 1200 now costs $4,000. The Model 230, formerly $5,950, is now priced at $4,950.

The models 150, 160 and 170 now cost $3,650 compared with the old price of $3,950.

Zeta Research is located at 1043 Stuart St., Lafayette, Calif. 94549.

Kwik-File Has Storage Trays

MINNEAPOLIS — A line of file trays that can accommodate microfiche, tab cards, reports and statements has been introduced by Kwik-File.

Priced at $21.95 for the 4-in. size and $28.95 for a 12-in. model, the trays are available from Kwik-File, 2845 Harriet Ave. South, Minneapolis, Minn. 55408.

Formex Has Grid Paper

TEANECK, N.J. — Formex, Inc. has introduced continuous program grid paper.

The grids provide a visible guide of the printing positions that are being used in various programs. The grids are spaced for 6 line/in. and 10 char/in.

The paper sells for $84 a carton and quantity discounts are available, the firm said from 101 Cedar Lane, Teaneck, N.J. 07666.

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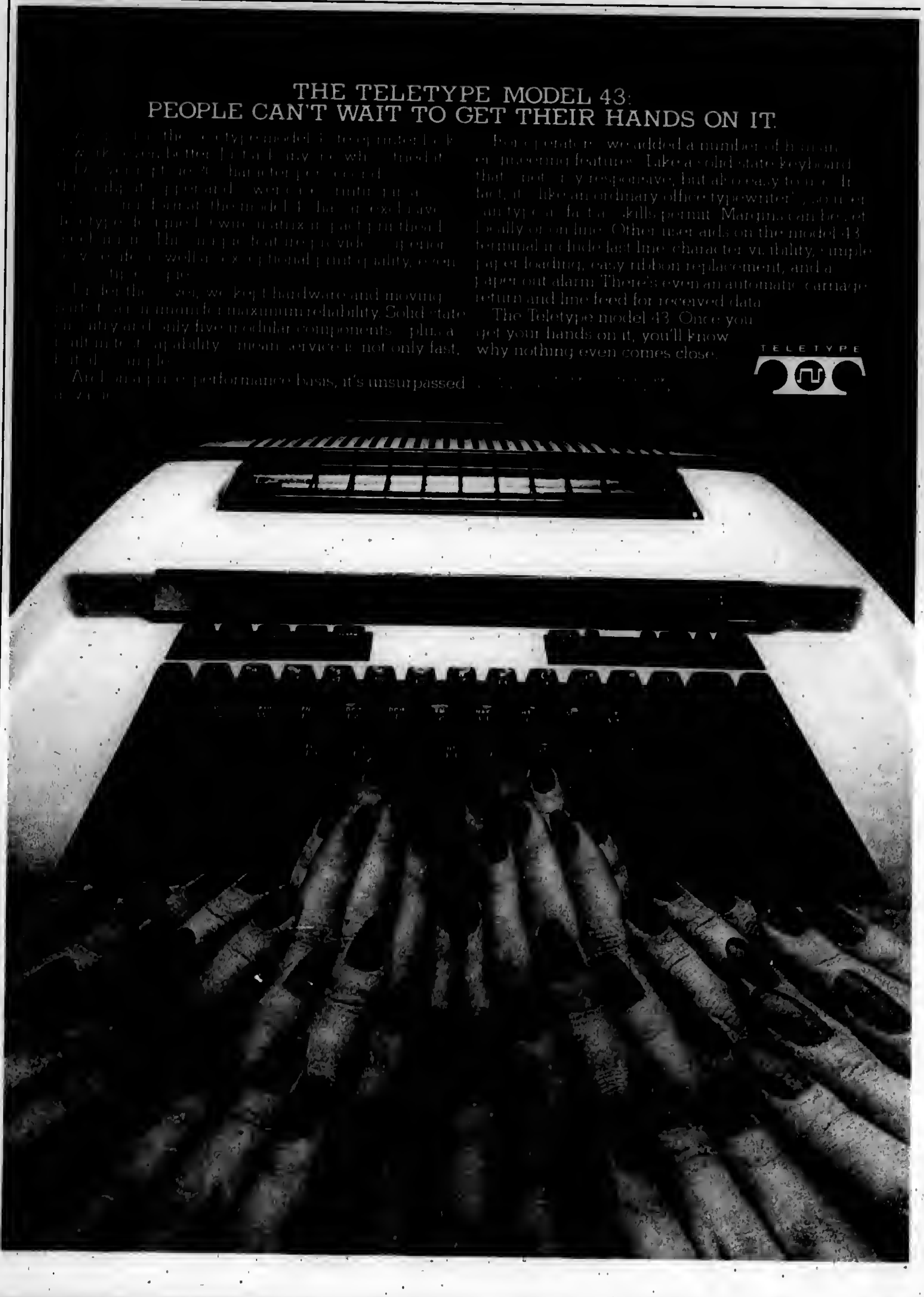

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[illegible] the Teletype model 43 teleprinter [illegible] work even better [illegible] [illegible] characters per second [illegible] upper and lower case [illegible] format, the model 43 has an exclusive Teletype-designed wire matrix impact printhead. This unique feature provides superior [illegible] as well as exceptional print quality, even [illegible].

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The Teletype model 43. Once you get your hands on it, you'll know why nothing even comes close.

TELETYPE

Office Services Courses Set

NEW YORK — The American Management Associations (AMA) will offer two courses, "Organization and Management of the Office Services Function" and "Managing Word Processing as an Office System."

The first seminar, lasting 2 1/2 - days will be open to 15 participants only and will cover such topics as choosing office equipment, controlling office supplies, in-house publications and getting the most for your communication dollars, a spokesman said. It will be held in New York on Nov. 21-23, in San Francisco on January 16-18, and in Denver on April 10-12.

"Managing Word Processing as an Office System," a three-day course, will involve a step-by-step approach to planning, implementing and managing a word processing center. It will be held in New York on Nov. 21-23.

Registration fee for the first course will be $375 for association members and $430 for nonmembers. The second course will cost $425 for members and $490 for nonmembers.

For further information, contact the American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Proxies Handled By OCR System

SPOKANE, Wash. — An optical character recognition (OCR) system that reportedly processes proxy cards automatically without presorting or punch-card preparation was introduced by the Key Tronic Corp.

The Proxyscan, fitted with special optical filters and increased illumination, can process proxy documents without restricting the types of marking implements to be used. The reading speed of the unit is 200 char./sec with an average throughput of 4,000 document/hr.

Documents may range in length from 2.5 in. to 8.75 in. and in height from 1 in. to 6 in. Shareholder identification number, issue number, the presence of one or two signatures, and up to 16 yes or no votes can be extracted in one pass, a spokesman said.

The Proxyscan consists of an automatic feeder, dual horizontal data reader, sort pocket, an M9 recognition unit and an interface.

The unit sells for $31,634. Key Tronics can be reached through P.O. Box 14687, Spokane, Wash. 99214.

Microfiche Reader Fits Under Counter

MENOMONEE FALLS, Wis. — Data View, Inc. introduced a "works-under-a-counter" microfiche reader, dubbed the Data View Cube, which it said was developed to streamline the micrographics user's environment.

The cube is designed to be able to drop into a desk teller station or any other workstation where the operator must be an integral part of the system, according to the firm.

The display screen comes in blue, green or gray and is available for under $1,500 from Data View, Inc., P.O. Box 537, Menomonee Falls, Wis. 53051.

Datagraphix Raises Fiche Recorder Cost

SAN DIEGO, Calif. — Datagraphix, Inc. has announced that the price of its standard off-line Autocom microfiche recorder will be increased 12% to $57,500, effective Dec. 1.

The price hike is the result of an increasing emphasis on new software and hardware flexibility by the firm, according to a spokesman.

Minidiskette Bins Hold 50 or 100 Units

NEW YORK — A storage and retrieval bin for minidiskettes has been introduced by Printcraft Systems, Inc.

Available in either a 50- or 100-capacity size, it sells for $22.50 and $25.50 respectively from Printcraft Systems, Inc., 11-17 Beach St., New York, N.Y. 10013.

Eotec Unwraps Line Monitor

SANTA CLARA, Calif. — An additional model of the TT-101 line monitor was announced by the Eotec Corp. here.

The Model II reportedly features technical advances over the previous model such as a 256-char. display with auto or manual modes; a wideband monitoring capability; serial transistor-transistor logic (TTL) interface; a logic recorder with an electronic strip chart display; high-speed operation up to 500Kbytes; auto polling and 801 auto call interface monitoring.

Prices of the basic unit, with all factory-supplied and loaded routines, start at $8,100 from the Eotec Corp., 2595 Martin Ave., Santa Clara, Calif. 95050.

Powering Up

POMONA, Calif. — A switching power supply, designed for high energy consuming equipment, was introduced by Electro-Module, Inc.

The PEX 058-00 is reportedly suited for computer mainframes and peripherals as well as for communication and process control applications. It has an input voltage of 115/230 VAC single phase and a transient response time of .5 msec, the firm said. Its single adjustable output is from 4.75V to 5.25V with current limit and overvoltage protection.

The unit, weighing 36 lbs., is priced at $925 from Electro-Module, Inc., 2855 Metropolitan Place, Pomona, Calif.

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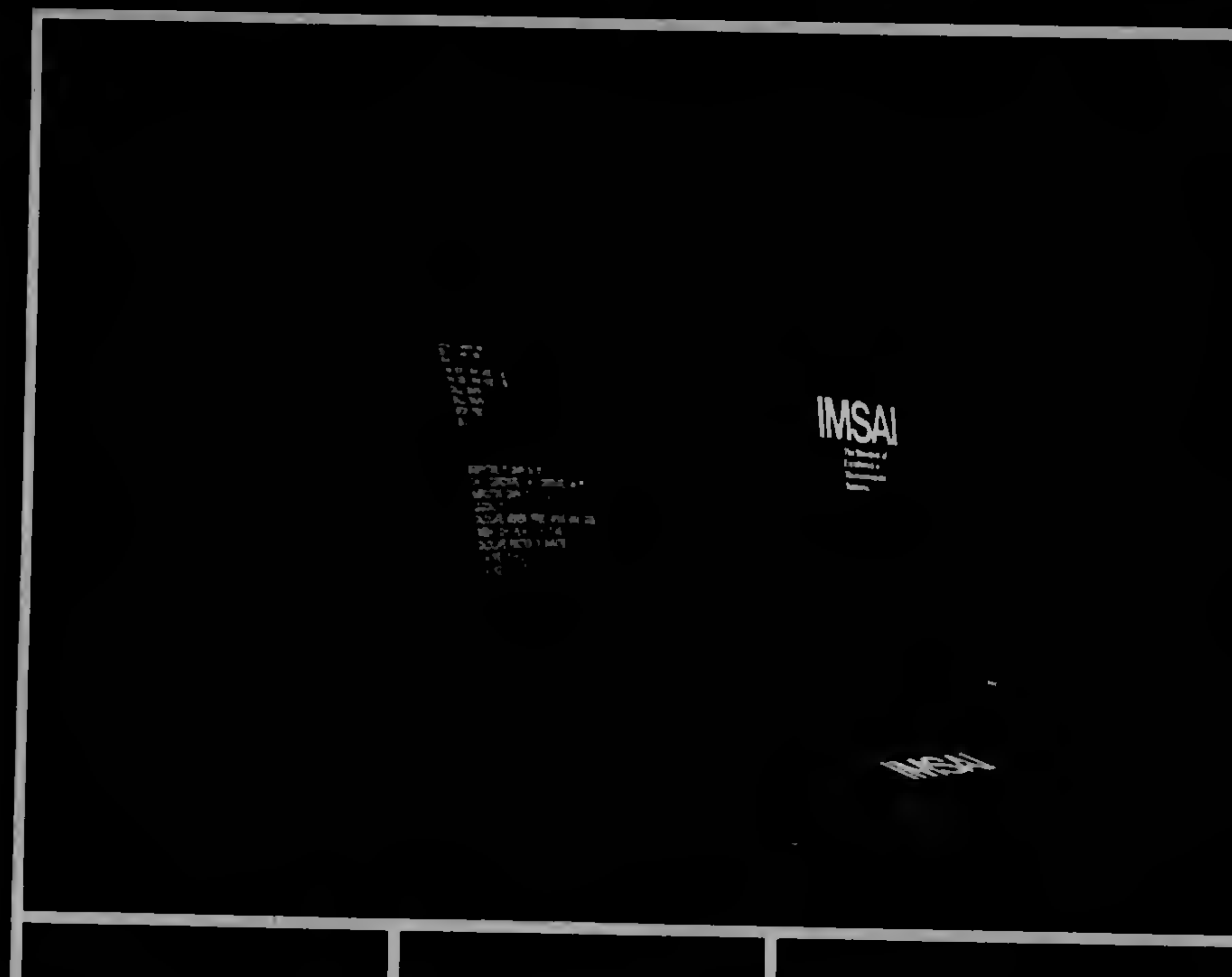

IMSAI introduces
the PCS-80
component system...

Switcher Bows

MIDDLETOWN, N.Y. – Multiple 60- and 415 Hz frequency converters can be switched between any number of IBM 3033, 370/168 and Amdahl Corp. mainframes with a unit that is available from KW Control Systems, Inc., according to the vendor.

The Matrix Switching Unit will allow frequency converters manufactured by different vendors to be incorporated into a large system, the firm claimed.

The output of the switch can reportedly supply 415 Hz power to the mainframes, allowing isolation between them.

The unit costs $12,000 from KW at R.D. No. 4, 114C, S. Plank Road, Middletown, N.Y. 10940.

Compuscan OCR System Uses Smart CRT

TETERBORO, N.J. – An optical character recognition (OCR) system with an intelligent CRT terminal has been introduced by Compuscan, Inc.

The Alphaterm can handle typed and keyed text and/or forms input. It provides output interfaces to paper tape and magnetic tape units as well as phototypesetters and modems.

The system also operates on-line to computers, the firm said.

Control of the system is through the CRT keyboard, which is used for editing, reformatting, displaying errors, entering parameters and displaying I/O on a horizontally split screen.

The software package provided with the initial units will be oriented to telecommunications applications; subsequent units will have software designed for graphics arts and word-processing functions, a spokesman noted.

The Alphaterm system sells for $58,000. Retrofitting to current Alpha and Alphacomm configurations costs $3,000 to $5,000. Compuscan is at 900 Huyler St., Teterboro, N.J. 07608.

TDC 2000 Gains Features

FORT WASHINGTON, Pa. – Honeywell, Inc.'s Process Control Division has enhanced its TDC 2000 process control system.

The enhancements include historical and real-time recording; alarm annunciation and displays; logging; CRT and keyboard interfaces to intelligent multiplexers; digital start/stop operations; and system security.

The latter is a Honeywell development called Uninterrupted Automatic Control (UAC). It automatically detects the malfunction of one to eight basic controllers, notifies the operator, switches in a reserve controller and resumes control of the process in less than 1 sec, Honeywell claimed.

All system additions were designed for use with circuits that plug into existing connectors, making it possible to update installed systems without extensive downtime, according to a division spokesman. The division is at 1100 Virginia Drive, Fort Washington, Pa. 19034.

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IMSAI 80/30 Integrated Video Computer (with Intelligent Keyboard–IKB-I) Standard Features:

☐ **Price assembled $1499.** IMSAI is the only S-100 bus manufacturer that offers a microprocessor driven keyboard with "N" key roll over, 2¼K of RAM, 8 expansion slots, choice of 4K, 16K, 32K and 64K RAM expansion boards, 3K ROM monitor, synch/asynch serial interfaces, parallel and serial ports, high resolution CRT monitor, 24 x 80 display with graphic editing and data entry features, and 28 amp power supply for the incredibly low price of $1499.

☐ **mpu Speed.** IMSAI is the only S-100 bus manufacturer that offers true 8080 compatibility, operating at 3 mHz.

☐ **RAM Included.** 2¼K.

☐ **Expansion Slots.** Eight expansion slots are provided in a new terminated and regulated motherboard (10 slots total).

☐ **RAM Board Sizes.** IMSAI is the only S-100 bus manufacturer to supply 4K, 16K, 32K, and 64K RAM memory expansion boards.

☐ **ROM Monitor.** IMSAI is the only S-100 bus manufacturer to provide 3K of ROM.

☐ **Asynch/Synch.** Only one other S-100 bus manufacturer provides both methods of data communication.

☐ **PIO/SIO.** IMSAI is the only S-100 bus manufacturer that provides two serial ports and one fully implemented parallel port at no extra charge.

☐ **Video I/O.** IMSAI is the only S-100 bus manufacturer to include a high resolution (14 mHz) monitor as an integrated part of the computer.

☐ **CRT Format.** IMSAI is the only S-100 bus manufacturer to provide a full 24 x 80 screen, which is two times the capacity of the common 16 x 64 screen.

☐ **Graphic/Edit.** IMSAI is the only S-100 bus manufacturer that provides graphics and text editing features with character and line insert/delete for your CRT display.

☐ **Keyboard Included.** IMSAI is the only S-100 bus manufacturer to supply a microprocessor driven keyboard with "N" key roll over and tiered construction for a true typewriter keyboard touch.

☐ **28 amp Power Supply.** The world famous IMSAI power supply assures stability and reliability of performance.

Options: IMSAI is the only S-100 bus manufacturer to provide a comprehensive array of fully integrated options including: line and character printers, CRT terminals, intelligent keyboard, ACR storage, standard and mini floppies, TTY BASIC with OS, 4K, 8K and 12K BASIC, audio cassette BASIC with OS, 8K disk operating system (DOS) based upon CP/M,* scientifically and commercially oriented disc BASIC and level 2 FORTRAN IV compiler.

☐ **Printers.** Only one other S-100 bus manufacturer can supply both line and character printers.

☐ **CRT/Keyboard.** IMSAI is the only S-100 bus manufacturer to provide both CRT terminal and intelligent keyboard as separate options.

☐ **ACR Storage.** Available.

☐ **Floppies.** IMSAI is one of the few S-100 bus manufacturers to provide both standard and mini floppies and the only S-100 bus manufacturer that supplies double density standard floppies.

☐ **TTY BASIC.** IMSAI is one of the few S-100 bus manufacturers that provides self-contained operating systems with 4K, 8K and 12K BASIC.

☐ **ACR BASIC.** IMSAI supports ACR BASIC with an 8K version.

☐ **DOS.** IMSAI is the only S-100 bus manufacturer to provide an enhanced version of the control program monitor (CP/M*) that can support up to 18 disk drives.

☐ **Disc BASIC.** IMSAI is the only S-100 bus manufacturer that provides both scientific and commercial versions of compiler oriented BASIC.

☐ **FORTRAN IV.** IMSAI is the only S-100 bus manufacturer that offers a level 2 FORTRAN IV compiler that operates under an enhanced version of CP/M.*

Prices and specifications subject to change without notice.
*CP/M is a trademark of Digital Research Corporation.

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Distributed DP Topic of Course

NEW YORK – A four-day seminar, dealing with distributed systems will be held here beginning Nov. 28 by the American Management Associations (AMA).

The course will cover the various aspects of processing and storing data at two or more sites, according to a spokesman. It will focus not only on the potential and probable benefits of a distributed system, but also discuss how such systems have changed the role of the manager; the problems of equipment selection, maintenance and implementation; and system security.

The problems involved in planning a distributed system will also be discussed. Such variables as design options, competing product claims and product availability will be covered.

The course was designed for technical management personnel, DP managers, analysts, designers, administrators and others involved with distributed systems.

The November course will be held at AMA headquarters in New York. It will also be given on Jan. 9 in Los Angeles, Jan. 30 again in New York and on March 27 in Chicago.

Registration fees are $490 for AMA members and $565 for nonmembers. With team discounts for three or more people from the same company, the fees are $420 for AMA members and $480 for nonmembers.

AMA headquarters are at 135 W. 50th St., New York, N.Y. 10020.

Contract Course Set

WASHINGTON, D.C. – A three-day course designed to explore the subject of contracting for services with the government will be held here Dec. 14-16 by Federal Publications, Inc.

"Contracting for Services" will initiate the participant into the area of government contract procurement while stressing both practical and legal considerations, according to a spokesman.

Topics covered will include "Foundations of Service Contracting," "Competing for Service Contracts," "Labor Requirements" and "Costs and Prices."

The registration fee is $425. Federal Publications is at Suite 500, 1725 K St. N.W., Washington, D.C. 20006.

Donkey Exercises Peripherals, Aids Testing, Repairs

KING OF PRUSSIA, Pa. — A portable, programmable test-and-excercise instrument designed for troubleshooting, repairing and testing computer peripherals has been introduced by Sorbus, Inc.

The I/O Donkey can test and exercise any input, output or communications device, serial or parallel, without tying up a computer or communications line, Sorbus claimed.

Parallel devices are operated to 500 kbyte/sec and serial devices from 50 bit/sec to 19.2 kbit/sec.

The unit was developed for use in a wide range of field services and is effective for disk and tape drives, line and character printers, card readers and punches and CRT terminals, a spokesman said.

Features include selectivity for isolating specific problems, 64 stored programs, manual program edit and entry, parity checking, scratch pad memory, a 1K programmable read-only memory for special data formats and an Ascii ripple generator with 64-, 128-, or 256-char. sets.

The unit, which is RS-232 and TTL-compatible, costs $3,495 from Sorbus at 150 Allendale Road, King of Prussia, Pa. 19406.

Course Aimed at Preparing For Office of the Future

NEW YORK — A course designed to prepare a company for future systems changes and technology will be presented here Dec. 5-7 by the American Management Associations (AMA).

The three-day meeting will discuss how to use management tools to effect the transition to an automated office; how to adapt nonroutine work for automation; and how to analyze workflow requirements in relation to space and technology, according to an AMA spokesman.

"The Automated Office of the Future" will also deal with equipment, mail systems and implementation strategies, he noted:

The seminar costs $425 for AMA members and $490 for nonmembers. Team fees for three or more executives from the same company are $365 per person for AMA members and $420 for nonmembers.

Additional details can be obtained from AMA at 135 W. 50th St., New York, N.Y. 10020.

Catalogs Offered Free to Readers

The following literature is available at no cost to readers:

- A brochure from Optronics International, Inc. details digital image processing instrumentation. The firm can be reached at 7 Stuart Road, Chelmsford, Mass. 01824.
- A catalog describing the Series AB card edge connectors is available from the Sales/Service manager, GTE-Sylvania, Inc., Titusville, Penn. 16354.
- A six-page bulletin on the details of the Gulton Industries, Inc. DM-1050 10-column thermal printhead is available from Gulton at 212 Durham Ave., Metuchen, N.J. 08840.
- CTS Corp. Catalog 3550E describes the firm's Series 550 variable resistors. CTS is located at 6800 County Road 189, P.O. Box 266, W. Liberty, Ohio 43357.
- The HP-19C and HP-29C programmable handheld calculators are described in a brochure from the Hewlett-Packard Co., 1507 Page Mill Road, Palo Alto, Calif. 94304.
- The 1978 catalogue of general instruments has been published by Wiltron Co., 825 E. Middlefield Road, Mountain View, Calif. 94043.
- A line of computer-grade push-button switches is detailed in a 16-page brochure from Dialight, 203 Harrison Place, Brooklyn, N.Y. 11237.
- A four-page brochure describing Western Union Data Services' Series 1232 teleprinters is available from that firm at 70 McKee Drive, Mahwah, N.J. 07430.
- A catalog of media filing modules is available from Kwik-File, Customer Service Dept. 2845 Harriet Avenue South, Minneapolis, Minn. 55408.
- A catalog of magnetically shielded floppy disk preservers is available from the Magnetic Shield Division, Perfection Mica Co., 740 N. Thomas Drive, Bensenville, Ill. 60106.
- Tariff, Inc. has a six-page brochure that explains the company's pre-audited, computerized freight payment plan. Contact Tariff, Department B, 53 Main St., Woodbridge, N.J. 07095.
- A 16-page booklet describing the remote computing services available from Calldata Systems, Inc. is available from the firm at 20 Crossways Park North, Woodbury, N.Y. 11714.
- An illustrated 22-page booklet describes how to use opto-isolators effectively, defines technology and shows connecting circuits for use with TTL devices. It is available from Jim Futer at Litronix, 19000 Homestead Road, Cupertino, Calif. 95014.
- Visual Methods, Inc., 5 Wortendyke, Montvale, N.J. 07645, has a brochure that describes some of its access control and visual surveillance systems.

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Planning Eases Strained Relations

By Ann Dooley
CW Staff

NEW YORK — The expectations of a first-time user are often not met by a minicomputer vendor — and vice versa, users and vendors agreed at a recent conference here.

But many of the frustrations encountered by both parties during the first-time user's conversion from a manual to an automated system can be avoided if the user gives some thought, planning and commitment to the project, according to Doug Kemp, president of Health Control Corp.

Total commitment to the conversion effort is the top priority, first and always, and that means a commitment by every department, Kemp stated. "If you don't have that commitment, don't do it — wait until you do have it," he urged.

In addition, the total importance of the system to the company must be stressed to all personnel, he said. A real problem can occur because people who haven't been through computerization have a negative attitude about it because it means change for them, he said.

But that change can be eased if the company tries to help its workers adjust, he added.

One thing the user company should do is designate someone with total authority or nothing will get accomplished.

(Continued on Page 66)

DDP: Buzzword Or Byword?

Almost every small business system vendor says it offers it; IBM is eyeing it; the mini makers say they've had it for a while, but they continue to enhance it; the data entry people are merging into it and some enterprising, pioneering users are actually trying it.

What is it? Distributed data processing, otherwise known as DDP.

In February, *Computerworld* will present a special report on DDP, designed to be a forum for users' ideas and experiences in that area.

If you are considering DDP, if you've distributed your processing, if you've sacked your mainframe in favor of multiple minis, or if you just have an opinion on the matter, CW would like to hear your story, and so would your fellow users. Just submit a double-spaced article about four or five pages long by January 15. Address it to Esther Surden, Associate Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

BST Offers 3741 Stand-In

SANTA ANA, Calif. — A device that functionally replaces both the IBM 3741 data entry device and 5471 console printer keyboard unit on the IBM System 3 will reportedly be available from Business Systems Technology, Inc.

The BST/41 Model 2 is an expansion of the firm's BST/41 line, a spokesman said. It has twice the throughput of the IBM unit, plus full system control, Operation Control Language history logging and diskette data preparation functions, the company claimed. BST noted that the unit is compatible with any System 3 configured with the 3741 and 5471 software and that Model 2 diskette units are interchangeable with those used on the IBM 3740 system.

Reading 3,000 records and writing at up to 2,400 record/min, the unit offers the standard IBM 3741 read/write Modes 1 to 5, a direct keyboard entry Mode 0 and a disk copy mode C, BST noted.

Several features of the system differ from those offered by IBM, the company continued. It performs edit and search functions with character insert/delete, cursor control and expanded search capability. In addition, a time-of-day clock is optional, it said.

The unit's keyboard, which BST noted is similar to the one on the 3741, is movable and cabled to the table top enclosure that houses the CRT and diskette unit.

The system will be available in December. It will be rented for $500/mo or leased for $475/mo on a one-year plan, $450/mo on a two-year plan, $425/mo on a three-year plan. Purchase price will be $16,200 from the company at 3015 Daimler St., Santa Ana, Calif. 92705.

Service Bureau Switch Brings Credit Information Control

By Esther Surden
CW Staff

NEW YORK — Borden, Inc. International here is bringing its credit information under control after making the switch from a service bureau to an on-line system running on a minicomputer.

"We recently implemented an on-line real-time credit and accounts receivable system," Nachum Bernard, manager of management information services, explained. The system is running in 98K words of memory in a partition of the mini. It also interfaces with a host of accounting applications.

Borden decided it needed to revise its method of handling credit information in order to shorten the period of time it took to approve or reject credit. Also, the service bureau only produced one output, an aged trial balance, which was insufficient for Borden's needs, Bernard noted.

The current system provides the capability to make an on-line inquiry into a customer's record to approve, reject or withhold credit while a sale is in progress.

The system is broken down into two phases — credit and accounts receivable. Each of the portions has inquiry capabilities and produces a variety of reports. Each runs from 9 a.m. to 5 p.m. daily with reports generated in the evening, he said.

Credit approval, checking and inquiries go through a master selector, he explained. Several passwords and other keys to the system must be used so that unauthorized personnel can not have access to the system. A user can inquire about Dunn and Bradstreet's rating of a particular customer, do a daily inquiry for credit exceptions to determine the status of a customer or find out when the last credit was rejected or approved for that company. "We can also determine which of the accounts are major delinquent accounts and can identify outstanding claims by a customer," he said.

The system is written modularly, Bernard explained. "A tremendous number of modules and programs are involved that are being overlayed, so that all those inquiry capabilities provided by the system are constantly co-resident," he said.

The system provides a reasonable response time of from 1.5 sec to 4 sec in most cases, he added, pointing out that this response time is "quite good" considering the overlays involved and the fact that "the files with which we are dealing are enormously large."

The system runs on a Data General Corp. Eclipse C300 with 92M-byte disk drives as well as communications gear. The terminals used for inquiry are either Hazeltine Corp. or Data General, he said. Programming was done in DG Fortran V, operating under the firm's mapped real-time disk operating system, he continued.

The system interfaces wiht the accounts receivable system so that whenever a credit is issued to a given customer, an accounts receivable record is immediately created and the balance can then be monitored.

It also interfaces to the order entry system, he said. Every time a sale is final, the information for a given customer goes to the banking portion of the order entry system. Whenever a record is put into the banking system, it triggers the accounts receivable file for a given customer in the credit and accounts receivable system, he noted.

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Planning Seen Easing Conversion Frustration

(Continued from Page 65)

Training is an essential part of computerization and time should be set aside specifically for the task of learning, he said.

Kemp also told the audience that decisions should be made as soon as possible and then put in writing to ensure efficiency.

Total commitment, the key to successful computerization, can be displayed by the amount of time set aside for the changeover, Kemp said. The time can be set aside by segmenting a certain amount and assigning someone time to be spent on learning the system.

Another method of converting is to bring in outside people if the present staff is really too busy to put aside any time, he said.

Installing a small business machine is really the same as installing a large processor — it's just a bigger box that costs more hardware dollars, but the procedures are the same, Kemp said.

Once the commitment has been made, customization and design of the system must occur, according to Kemp.

The system shouldn't be designed for the president of the company or the programmer, but for the people who operate it, Kemp said. Their needs should be determined before design begins, he added.

In addition, he pointed out, it's essential to get user input in order to differentiate between what is needed and what is nice to have.

Once input is received, the best working format is selected and an analyst is consulted, the person in charge should make the final decision on his own, Kemp advised.

After the system choice has been made, staffing and training should be the next priority since "people make or break the system."

Decide who's going to work in what area, train them and assign them a specific time for the changeover, Kemp suggested. The manager should also evaluate his staff since some people just don't work well with automation and can't make the change, he warned.

Converting the manual data to the automated system is the most time-consuming part of the process, so good planning is necessary, he said. Operation schedules and procedures should be written, done the same way each time and performed at an assigned period of the day.

A system should be purged regularly, the data stored elsewhere and numerous audit trails implemented since more can go wrong with an automated system than a manual one, he noted.

Philips Gives U.S. Users System Options

WOODBURY, N.Y. — Philips Business Systems, Inc. unveiled two products for U.S. small businesses recently.

Described as fully integrated hardware/software systems, the units were designed for first-time users or those presently replacing accounting machines.

The Model 330, which uses Visual 1 software, includes a 1,920-character CRT with a hard-copy printout capability, front forms-feed handling, a matrix printer and two double-density floppy disk drives.

Program input for the Model 330 is via cassette tapes, a spokesman said, and up to four floppy drives can be accommodated.

The 330 is supplied with software for sales accounting, general ledger, inventory management, accounts receivable and payable and financial statements.

A feature of the system allows the user to continue operating with his current invoices; up to 40 invoices with five product lines and up to 80 invoices with one product line can be printed each hour, the firm said.

A formatter allows the system to conform to the user's invoice, the spokesman added.

The system's nonvolatile core memory is "used as a data dump," the firm said.

The second system introduced was the Model 430, which "has all the capabilities of the 330 plus removable cartridge disks and the ability to be programmed in Cobol and RPG," Philips said.

The Cobol is ANS-compatible and the RPG is similar to that of the IBM 32, the spokesman noted. Users wishing to convert from the IBM 32 to the Philips system would need to go through a program conversion process, he added.

Memory for the larger system is MOS. Minimum memory available is 32K and is expandable in 16K increments with no upper limit placed on the amount the system can accommodate, a spokesman claimed.

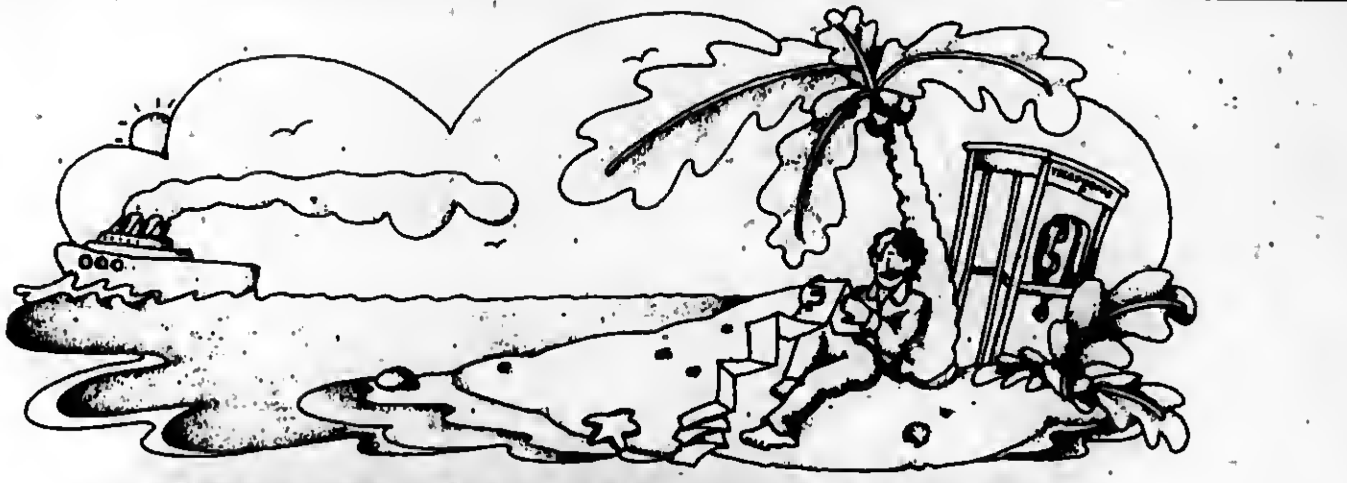
Multiple printers, disk drives in 10M-byte capacities and CRTs can be attached to the Model 430, which runs under a disk operating system featuring multiprogramming, spooling, job streaming, and random, sequential and dynamic file access capabilities, the firm noted.

Tuning Available

A typical Model 430 has 32K bytes of memory, a single-screen CRT, a 100 char./sec printer and 10M bytes of disk and costs $33,000.

A Model 330 can range in price from about $25,000 to $30,000. Some minor software tuning is required to fit the applications to the user's shop and the pricing depends on the extent of modification required.

On the average, the tuning would cost about $2,200 the spokesman stated from 173 Froehlich Farm Blvd., Woodbury, N.Y. 11797.



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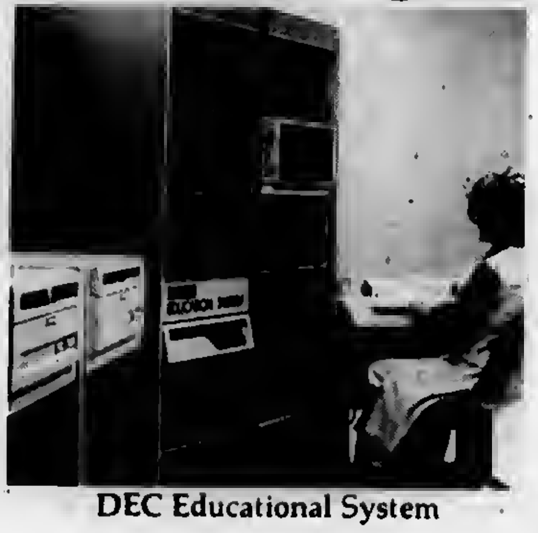
Educational Units Packaged

MAYNARD, Mass. — Digital Equipment Corp. has packaged some systems especially for educational users. The systems range from entry-level interactive and mark-sense batch systems to a multi-language time-sharing system.

A single-user ES210/C composed of a PDP-11/03 CPU with 56K bytes of MOS memory, dual floppy disk unit, CRT or Decwriter II printer, RT-11 operating system and Basic costs $15,613.

The ES570/W includes a PDP-11/70 with 256K bytes of memory, 176M-byte disk unit, 9-track tape system, 300 line/min printer and Decwriter II console. Software includes the RSTS/-E operating system, Basic Plus-2, Decal (DEC's author language for computer-aided instruction) plus one scientific and one commercial language. This system is priced from $165,060.

Other systems are available from the DEC in Maynard, Mass. 01754.


DEC Educational System

Cache Buffer Fits PDP-11s

MINNEAPOLIS — Fabri-Tek, Inc. has introduced its Model 920/981 cache buffer enhancement for Digital Equipment Corp. PDP-11 minicomputers.

The Model 920/981, which uses bipolar technology, provides 2K bytes of memory on two printed circuit cards, forming a single plug-in module.

In PDP-11/35 and 11/40 computers, the cache buffer can be used to replace the M981 Unibus Terminator module, Fabri-Tek said.

In PDP-11/34 and other PDP-11 Series processors, it replaces the M920 Unibus Jumper Module.

The Model 920/981 buffers the whole CPU main memory. The module requires no hardware or software modifications, and comes with an on-line/off-line switch capability, the company said.

Cycle/access time is 300 nsec.

The price for a single cache buffer is $4,250, Fabri-Tek said from 5901 S. County Road 18, Minneapolis, Minn. 55436.

System Built on 8080 Type

SANTA ANA, Calif. — A small business system designed around an 8080-type microcomputer is available from Applied Data Communications here.

The Advent 1000 system includes the CPU, an IBM-compatible floppy disk drive and a CRT. It can expand to include up to eight floppy disk drives, 64K of memory, four 10M-byte disk cartridges, eight CRTs, a magnetic tape drive and three printers, the company said.

Capabilities include asynchronous communications at 9,600 bit/sec and synchronous communications at 19.2 kbit/sec.

The system operates under Micro-DOS/Basic, which the vendor said is an amplification of Dartmouth Basic that allows easier writing of programs. The software also includes a file-oriented data base management system and an interactive multiuser operating system.

The Advent 1000 features string handling, string match and variable length strings and string arrays. Sequential, relative and indexed sequential files are also handled, the firm said.

A basic system with 32K bytes of memory, two floppy disks, CRT and a 60 char./sec printer costs $9,500 from the company at 1509 E. McFadden Ave., Santa Ana, Calif. 92706.

Ampex Memory Fits PDP-11

EL SEGUNDO, Calif. — Ampex Corp. has an add-on parity memory that provides 32K to 128K words of memory for any Digital Equipment Corp. PDP-11 system using a Unibus structure.

The ARM-1100P add-on memory was designed to expand memory from any 8K boundary in 32K increments up to the maximum of 128K words. It uses only one CPU slot and requires one Unibus load, Ampex said.

Each ARM-1100P is supplied with wired card rack, power supply, interface, parity control, cooling fans and interconnecting cables, making the memory independent of the CPU with the only interconnection via the Unibus interface, the firm said.

Two-Way Interleaving

The ARM-1100P provides an access time of 375 nsec and a full cycle time of 700 nsec. In addition, two-way interleaving of equal blocks of Ampex and DEC memory is available, the spokesman noted.

The ARM-1100P add-on memory ranges in price from $4,950 for 32K to $12,750 for 128K. Ampex is located at 200 N. Nash St., El Segundo, Calif. 90245.

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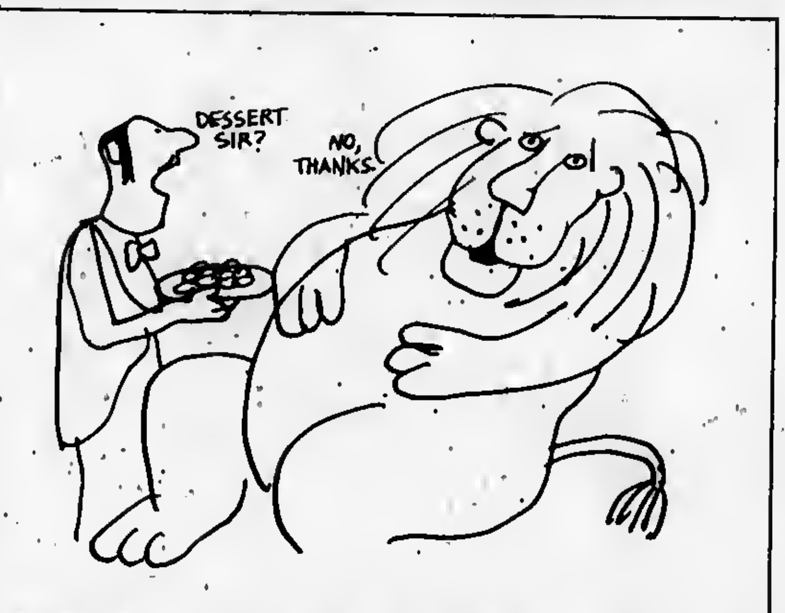
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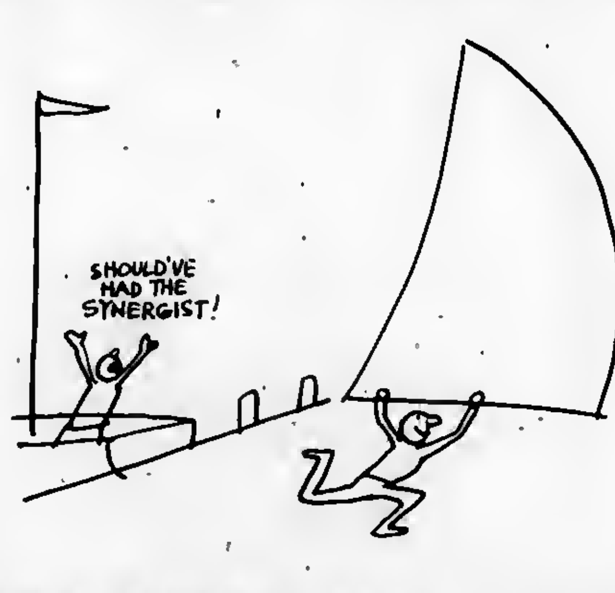
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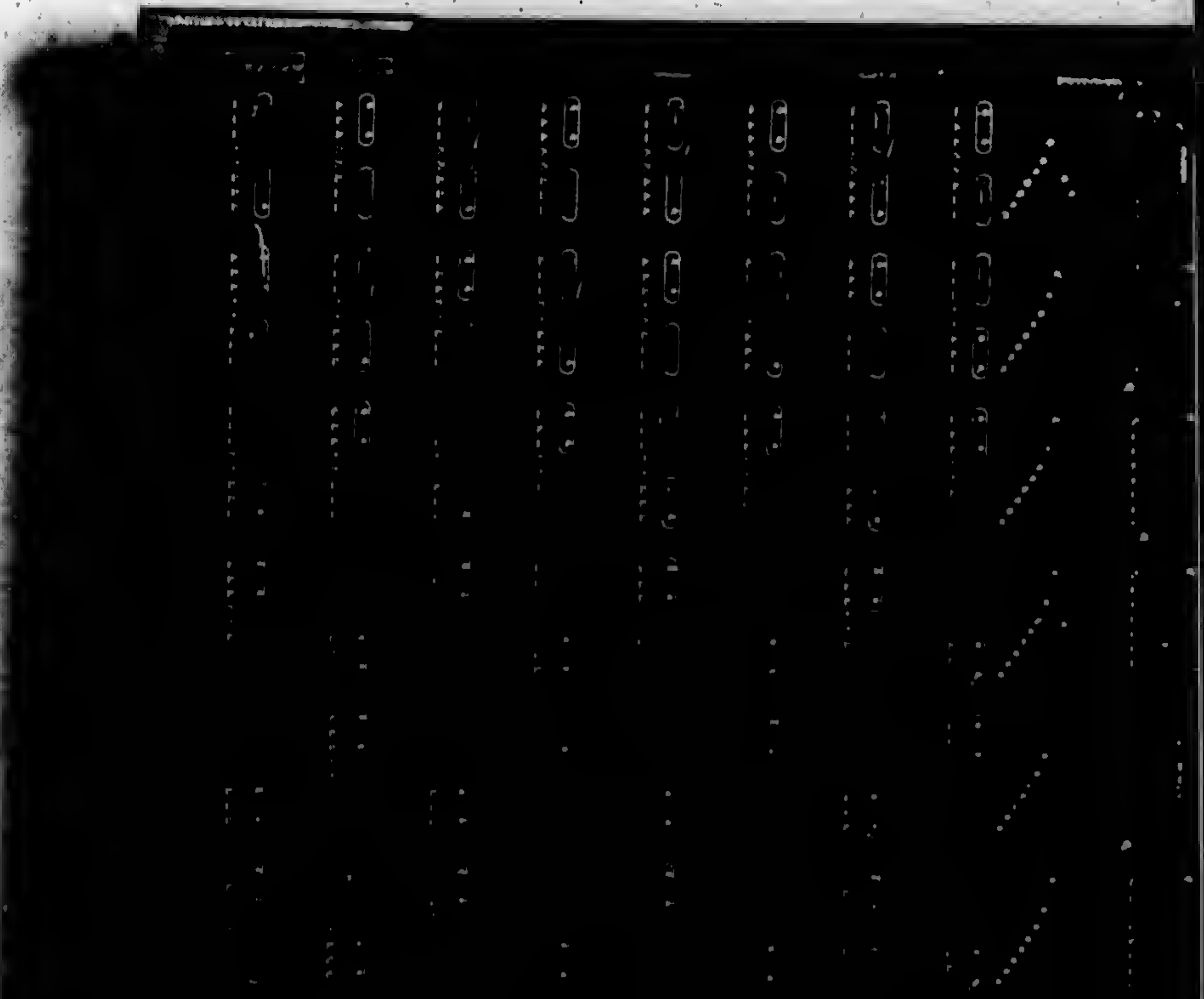

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CDC Extends Disk Options

CDC 9448 Drive

MINNEAPOLIS — Control Data Corp.'s 9448 cartridge disk drive was designed for use with minicomputer and small business systems.

The drive transfers data at 9.6M bit/-sec and is interface-compatible with the company's storage module drive and mini module families of disk products. Users can mix the three types of drives on a single controller, the company said.

The 9448 is available in three basic models with storage capacities of 32M-, 64M- or 96M bytes of memory. The module accommodates a 16M-byte front-loading cartridge and up to 80M bytes of fixed disk, CDC said.

Removable Cartridges

Using the drive, data can be copied from fixed disks to removable cartridges for security, a spokesman noted.

Average access time for the disk is 30 msec and average latency is 8.33 msec at a 3,600 rev/min rotational speed, he said. Each recording surface includes 384 track/in. and data is recorded at densities of 6,038 bit/in.

The 9448 drive includes microprocessor-based control logic and is available in a cabinet or in a rack-mountable version. It costs $3,900 for the 32M-byte model, $4,950 for the 64M-byte unit and $6,000 for the 96M-byte module.

The removable cartridge costs $205. It will be available in the second quarter of 1978 from CDC, Box O, Minneapolis, Minn. 55440.

HP Unit Gathers Obstetrical Data

WALTHAM, Mass. — Hewlett-Packard Co. has a mini-based obstetrical data system that, when linked to bedside HP 8030 series cardiotocographs, simultaneously gathers fetal heart rate and uterine activity data.

The heart of the system is the high-speed, large-memory HP 9825A desktop computer, which features an integral printer and uses magnetic tape cassettes for data and program storage and retrieval, a spokesman said.

The basic obstetrical data system costs $17,000 from HP's Medical Products Group, 175 Wyman St., Waltham, Mass. 02154.

Help for 3/10

KING OF PRUSSIA, Pa. — Sorbus, Inc. has inaugurated a maintenance service program designed to meet the needs of IBM users.

The maintenance service plan includes both preventive and remedial maintenance for all standard components of an IBM 3/10 including CPU, peripherals and associated communications equipment, Sorbus said.

23 Service Areas

The plan is now available in 23 service areas including Atlanta, Baltimore, Charlotte, N.C.; Chicago, Detroit, Houston, Kansas City, Kan.; and Los Angeles.

Sorbus is located at 150 Allendale Road, King of Prussia, Pa. 19406.

Continental Has Line Printers

BEDFORD, Mass. — A series of medium- and high-speed line printers has been introduced by Continental Resources, Inc.

The series includes the CP-300, which can print 160- to 300 line/min, the CP-600, which runs at 330- to 600 line/min; and the CP-1000, which handles 580-1,200 line/min.

Each features chain technology and full print line buffering, the firm said. The series is compatible with Digital Equipment Corp.'s PDP-11 minicomputers.

The cost of the CP-300, CP-600 and CP-1000 printers is $12,500, $15,500 and $17,500 respectively, Continental said from 175 Middlesex Tnpk., Bedford, Mass. 01730.

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SEE PAGE 3.

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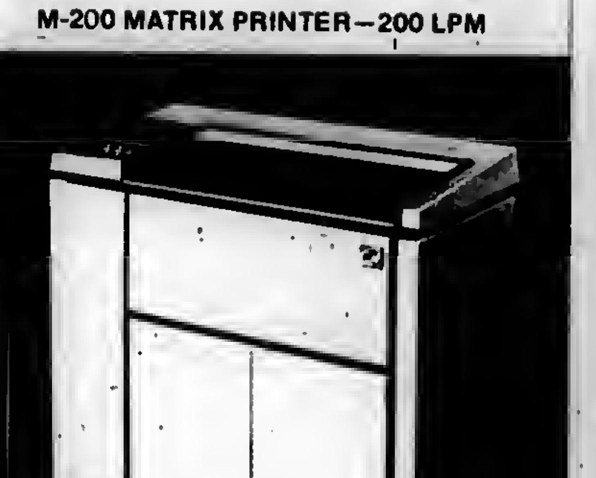

2560 CHARABAND [illegible]

Small System Treats Pharmacy's Cash Flow Ills

By a CW Staff Writer

DES MOINES, Iowa — A small business system at a pharmacy here has been the prescription for the firm's cash flow problems, according to Ron Secrest, partner in Sun Park Fair.

The pharmacy had been experiencing rapid growth. "Probably 50% of our business is done with insurance companies that insure a whole group of people," Secrest explained. Filling out the forms took a great deal of time and that tied up the cash flow. "Now we can fill in and send in the forms every day," cutting turnaround time by some 30 days, he noted.

"Our business expanded to the point that we knew we needed to hire more people, while we also needed a more sophisticated recordkeeping method," he said. This pointed to computers as a solution. So the company began looking for some way to accomplish its goals. First it looked at three or four companies that would put a terminal on-line to a large computer at a wholesale pharmacy outlet, but "we liked the idea of having the system in-house and being able to tailor it to our needs," Secrest said.

The company looked around but couldn't find a small system that had a pharmacy application at that time, he noted. Olivetti Corp. of America, however, was willing to work on writing one with the company, so it installed an A5 accounting system.

The system "sits right where we used to have typewriters," Secrest said. Because of Iowa laws requiring that all prescription labeling must be handled directly by a registered pharmacist, the pharmacists do all the data input themselves. Insurance forms, however, can be prepared with help from clerks, he added.

Follows Rules

"There are a lot of federal as well as state rules that have to be met when filling prescriptions," the pharmacist noted. For example, the pharmacy must keep a record of each prescription including for whom it was filled and other pertinent information. These records must be posted in a journal so that inspectors can examine them. The system keeps track of the prescriptions filled each day and at the end of the day produces a summary report for the journal, Secrest noted.

Each prescription must also be labeled. Formerly a manual procedure, the labeling application is now automated so that if the pharmacist is filling a prescription for the second time, he need only insert a magnetic card into the system. Thus, any prescription is just typed once.

The system also produces a "neatly typed receipt," which is somewhat of a novelty in the pharmacy business, he indicated. Many receipts are unacceptable to insurance companies, while this one is detailed enough for their needs.

ITI Schedules Winter Courses

McLEAN, Va. — Three courses on minicomputers and distributed data processing will be offered by Innovative Technology, Inc. (ITI).

A four-session course for managers who "require an overview of the latest computer hardware and software technology" will be given on Tuesday evenings beginning Nov. 15 from 7 p.m. to 9:30 p.m. at the company's headquarters here.

A repeat performance beginning March 7 will be given every Tuesday and Thursday evening during the same hours.

A six-session course to provide DP managers with an efficiency checklist for their systems and to identify the techniques and hardware available to the managers will be offered Jan. 1-26 on Tuesday and Thursday evenings.

An eight-session course for system analysts and programmers will be taught on Wednesday evenings beginning Feb. 8.

The four-session course costs $300, a six-session course costs $400 and an eight-session course costs $500. Information is available from the company at 1651 Old Meadow Road, McLean, Va. 22101.

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Redundant Minis Viewed Path to Fault-Tolerant DP

By Esther Surden
CW Staff

SEATTLE — Using minicomputers for fault-tolerant computing is becoming more important as these small systems are increasingly being used in life support applications in hospitals or for vital maneuvers in the space program, according to Richard J. Spillman, a doctoral student in electrical engineering at Utah State University.

Delivering a paper entitled "A Fail-Safe Redundant Architecture for Fault Tolerant Computing" at a recent conference here, Spillman noted that redundancy is the most common method of obtaining fault tolerance.

A technique often used is the triple module method, in which three copies of a module perform the same function. A separate voter module selects the majority output in a case of a failure, Spillman explained.

Another method of obtaining fault tolerance is the hybrid method, which uses an elaborate system of switches and spares. The switching system has the task of swapping out a bad module and replacing it with a good spare.

Both of these systems have disadvantages, Spillman noted. If two of the modules using the triple module technique go bad, the voter selects bad output because it must select the majority output. In addition, the voter itself is subject to failure.

Systems using the hybrid method have problems with complicated switching circuits and spare parts that run out, he added.

Fail-Safe Systems

Fail-safe systems use an entirely different technique of fault tolerance. These systems are designed to fail in such a way that the least amount of damage will take place.

For example, in a traffic system, all the lights will fail by turning red, not green, because it is safer for the cars to stop. In a medical situation, such a system would notify the doctor or nurse when it failed so the patient would not be left unsupported.

Describing a method that combines fail-safe techniques with triple module redundancy, Spillman presented a system model in which each module is made fail-safe so that if it fails, it produces an output upon which the gate will not act.

The voter then becomes a very simple switching device, not often subject to failure, which will only let outputs other than the inaccurate one pass.

Some advantages to this method include the use of a simpler gate which is less likely to fail. Also, no restrictions are placed on the number of modules that can be used.

Some disadvantages can be associated with this method, he admitted. For example, fail-safe design requires some extra gates within the modules which slightly increases the probability of failure.

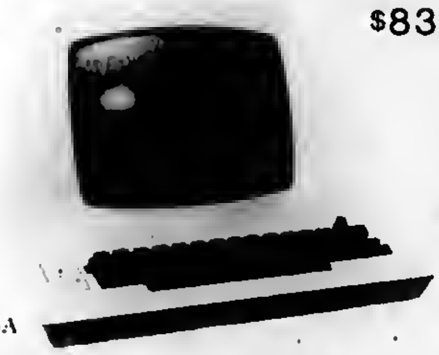
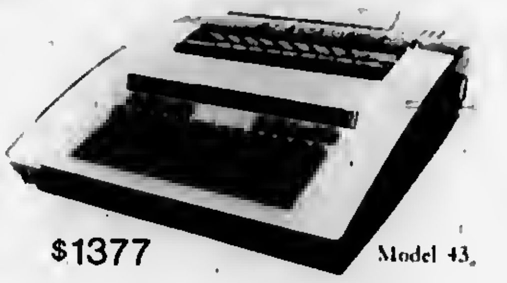
In addition, multiple faults can go undetected, producing an unsafe fail. Scientists are working on the problem.

Techtran Adds Disk Recorder

ROCHESTER, N.Y. — A microdisk recorder that is compatible with Digital Equipment Corp., Intel Corp. and RCA disk systems has been introduced by Techtran Industries, Inc.

Diskettes recorded on the Techtran 9512 via an RS-232 terminal or data logger can now be read on these minicomputer disk systems. Also, diskettes generated on-line from DEC, RCA or Intel systems can be read off-line back to an Ascii terminal or to a remote location.

Standard features reportedly include random access by character string and bidirectional skip. The unit sells for $2,595 from Techtran at 200 Commerce Drive, Rochester, N.Y. 14623.

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TDL Offering Fortran IV For Micros

PRINCETON, N.J. — The "first complete" Ansi-standard Fortran IV designed and written for a microcomputer has been introduced by Technical Design Labs, Inc. (TDL).

This Fortran IV is equipped with extensions that reportedly exceed the usual Ansi standard requirements. The package includes a full type conversion, a full library of scientific and string functions, a linking loader with an automatic library search, fully formatted I/O, sequential and direct access I/O and hex constants, the firm said.

The complete package, which runs with less than 24 K and includes the floppy diskette with object code and a user's manual, costs $349 from Technical Design Labs, Inc., Research Park, Building H, 1101 State Road, Princeton, N.J. 08540.

Publishers, Stores Abound

First Midwest Show Has Local Flavor

By Frank Vaughan
CW Staff

CHICAGO — Over 12,000 visitors poured into the "world's largest" Holiday Inn here to see 84 booths and more than 60 exhibitors at the '77 Midwest Personal Computing Show.

The show had a slightly different flavor from most of the microcomputing shows this year. The manufacturers did not dominate the exhibit space; instead, publishers, stores and dealers were in great abundance.

Of the major vendors who did exhibit, Commodore's Pet was probably the most sought-after exhibit, with the exhibitors immediately surrounding the double booth benefiting from the overflow.

Tandy Computers (Radio Shack) also drew a great deal of interest from the visitors, as it has at the past few shows, partly because it offers one of the more visible microcomputing systems in the noncomputer retail area.

Digital Equipment Corp., which also participated in New York's Personal Computing Exposition, was one of the more unusual exhibitors. Although the minicomputer firm brought no hardware to either show, limiting its sales to cases upon cases of books, it also did some personnel recruitment.

"I personally know of no plans that DEC has to enter the hobby area, but then I don't know everything that DEC does," one of the recruiters said. DEC's purpose in attending hobby shows is twofold, the exhibitor noted. First, hobbyists look for a lot of the manuals and documentation that DEC has published for its minicomputer lines, especially in the PDP-8 area. Second, the hobbyist makes a very attractive employment candidate.

Largest Display

Mits had the largest display on the show floor, taking six booths on the end of an aisle. The firm only used four of the six booths to give an island effect, which drew hobbyists from all directions. The booth also was staffed by employees of some of the local Mits/Altair stores, in keeping with the local flavor of the show.

Among the publishers present, Creative Computing, People's Computer Co., Personal Computing (show sponsors) Matrix Publishers/Dilithium Press, Hayden Books and Kilobaud provided a variety of reading material for the hobbyist.

Creative Computing magazine's booth contained its usual assortment of magazines, books and catalogs — along with some of the not-so-usual items such as binary dice and the firm's "Computer Rage" game. Personal Computing sold mostly back issues while Kilobaud's Wayne Green drew large crowds of both hobbyists and Ham radio enthusiasts who were interested in picking up books, magazines, back issues and a chance to win a trip to the Caribbean. Hayden and Dilithium (named after the types of crystal needed to power the warp drive on television's Starship Enterprise) both sought out the hobbyist-store owner trade for book sales.

Among the dealers offering mail-order catalogs were the Byte Shop/Micro Age stores and the Itty Bitty Machine Co., Inc. who ask that people spell out the company name fully because "we don't want to be confused with any other computer company selling hardware under our initials."

Educationwise, the show offered both free and paid seminars for the visitors. Among the free seminars was "Math Packages for Small Business Applications" by Gerald Koppel of the AAA Chicago Computer Center; "Introduction to Computer Hardware;; by Arthur Kingsnorth of E&L Instruments; "Computer Music for the Hobbyist" by Malcolm Wright of Solid State Music as well as several others.

Seminars which users had to pay for included a series on microprocessors by Rodney Zaks of Sybex and a "computer school" by Gene Morrow of Computer Power and Light.

In New York City

Show Introduces Uninitiated to Micros

By Frank Vaughan
CW Staff

NEW YORK — Every time one of the elevator doors opened, another mob piled into the already crowded floor of the Personal Computing Exposition at the Coliseum here. By the end of the three-day show, over 13,000 people had managed to crowd onto the floor, many of them apparent newcomers to the field.

The show here was large, with wide aisles, 142 booths and 94 exhibitors. Many of the major manufacturers were present, as were most of the firms' product lines, either through manufacturers' or dealers' booths.

The crowd at the show was different from that of most microcomputing shows, with the $5 admission fee attracting many people who otherwise might not have attended. Many of the dealers were made acutely aware of the large number of uninitiated visitors when they found themselves answering fundamental "what-is-a-microprocessor?'-type questions.

In a sense, the show here was the first chance for the public to actually see microcomputers — and the results were favorable, if the number of bundles, bags and boxes being carried out the doors was any indication of total sales.

Even the local entrepreneurs were out in strength. One youth walked the show floor in search of a customer to buy a slightly used calculator. And the ever-present Coliseum hot dog (all beef, only $1.35) sustained many of the vendors for the three days of the show.

Free seminars encompassed such subjects as "Applications of Home Computers: The Myth and the Reality"; Microcomputers in Education"; "How to Build Personal Computer Kits"; and the general subjects of speech analysis, music, getting started and music synthesis. Speakers during the show ran the gamut from publishers (David Ahl, of *Creative Computing*, Robert Jones of *Interface Age* and Carl Helmers of *Byte*) to store owners (Dr. Portia Isaacson of the Micro Store) to scientists (David Fylstral of SRI International).

A series of special programming sessions was also run with such topics as: an introduction to Warnier-Orr structured programming; the SMAL/ST compiler; teaching calculators tricks; basic Basic; proving that a program is correct; and a high-level assembly language for micros.

Rounding out the educational opportunities at the show was a series of tutorials by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society. Six day-long tutorials were held, three at the basic level and three at the intermediate/-advanced level.

One of the more unusual exhibits came under the title of Microcomputers for the Handicapped, an organization that was formed at Personal Computing '77 in Atlantic City under the leadership of Dr. Robert Suding, research director of The Digital Group. The group is interested in using microcomputers to assist the handicapped in the daily routines.

Book 'Debugs' Debugging

DERBY, Conn. — A paperback book that describes a method of entering, debugging and storing assembly language programs is available from E&L Instruments, Inc.

DBUG: An 8080 Interpretive Debugger, by Christopher A. and Jonathan A. Titus, instructs the user on how to enter a program into an 8080 microcomputer memory and single-step it through, instruction by instruction.

Dbug resides in a 1K-byte block of memory and I/O routines can accommodate magnetic tape cassettes, CRT terminals or paper tapes.

The book, including a bootstrap loader, two listings (one in octal code and the other in hexadecimal) and examples of applications costs $5 from E&L Instruments, Inc., Derby, Conn. 06418.

B

batch processing — 1. In computer terminology, batch processing refers to a specific method of processing in which a number of similar input items are grouped for processing during the same machine run. 2. Batch processing computer systems generally do not require immediate updating of files. In batch processing, data is gathered up to a cutoff time and then processed.

baud rate — A type of measurement of data flow in which the number of signal elements per second is based on the duration of the shortest element: When each element carries one bit, the baud rate is numerically equal to bits per second (bit/sec).

benchmark — In relation to microprocessors, the benchmark is a test point measuring the performance characteristics of products offered. A benchmark program is a routine or program selected to define or compare different brands of microprocessors. A flow chart in assembly language is often written out for each microprocessor, and the execution of the benchmark time, accuracy, etc. is evaluated.

bidirectional — Generally refers to interface ports or bus lines that can be used to transfer data in either direction, e.g., to or from the microprocessor.

binary code — A code in which every code element is one of two distinct types of values. For example, the presence or absence of a pulse.

binary coded decimal (BCD) — A system of number representation; that is, an information code in which each decimal digit is represented by four binary digits.

binary dump program — — A program that provides a means for printing displaying or punching a binary tape copy of any portion of memory. The output may be selected as either absolute or binary relocatable.

binary loader — This is used to load a binary format such as those produced by the binary dump program, the link editor or an assembler into memory.

biopolar (unipolar) — When a logical "true" input possibly is represented by an electrical voltage polarity opposite to that representing a logical "false" input, the signal is defined as bipolar. If both "true" and "false" inputs are represented by the same electrical voltage polarity, the signal is defined as unipolar.

black box — A generic term which can describe any unspecified device performing a special function where the inputs produce specific outputs.

LEARNER'S LEXICON

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RCA Microtutor II Gives Programming Experience

SOMERVILLE, N.J. — A microcomputer system designed for hands-on operating and programming experience has been announced by RCA.

The Cosmac Microtutor II is preassembled and contains its own regulated power supply, the firm said. The unit provides input via eight binary toggle switches and output on two seven-segment light-emitting diode (LED) hexadecimal digit displays.

Microtutor II is supplied with 256 bytes of complimentary MOS random-access memory (RAM) on a card that attaches to the base through a standard 44-pin connector, a spokesman noted. An additional prewired socket and connectors are provided for system expansion.

More RAM and user I/O interfaces can be connected to this socket and an operating system can be loaded to provide a utility memory, the spokesman added.

The unit has a crystal clock for stabilized timing applications and a memory protect switch which prevents the memory write operation from writing to itself.

The Microtutor II, which operates from a 115V 50/60 Hz power line, is priced at $195 from RCA, Box 3200, Somerville, N.J. 08876.

I/O Board Options Grow

NORWOOD, Mass. — Analog Devices, Inc. has expanded its analog input/output subsystem product line to include data acquisition and analog ouput boards that are said to be compatible with Texas Instruments, Inc., Pro-Log, Intel Corp., Motorola, Inc. and National Semiconductor Corp. microcomputers.

For the Pro-Log 4- and 8-bit microcomputers, Analog-Devices introduced RTI-1220, a 16-channel data board priced at $269, and the RTI-1221, a 4-channel analog output board priced at $235 for 8-bit accuracy and $275 for 10-bit accuracy.

For the Intel SBC80 and MDS and the National Semi BLC80, there RTI-1201, a 12-bit analog output board priced at about $375 and the RTI-1202, a 16-channel, 12-bit board that costs approximately $400.

For the Motorola MM6800, Analog Devices announced the RTI-1230, a 16-channel, high-speed analog input board priced at about $450; the RTI-1232, a 4-channel analog output board priced at approximately $425; and the RTI-1231, a complete 16-channel analog input/output subsystem that costs about $500.

Analog Devices is at Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

Introductory Course Slated

DELRAN, N.J. — A three-day introduction to microprocessors that will examine hardware and software, provide design experience and look at future trends and developments will be offered by Datapro Research Corp., beginning Dec. 7 in San Francisco.

Designed for people who are active in or contemplating the use of microprocessor technology, the course will consist of an introduction and definition of micro systems, explanation of interface design, and a workshop on interface usage.

Registration fees are $425 for Datapro subscribers and $475 for nonsubscribers. Additional information can be obtained from Datapro Research at 1805 Underwood Blvd., Delran, N.J. 08075.

Periodical Guide Available

ALOHA, Ore. — A guide that indexes 1,080 articles from 23 hobby and professional computer publications and contains editorials, book reviews and letters from readers which relate to the personal computing field is available from E. Berg Publications.

The *Periodical Guide for Computerists* is available for $3.00 from the publisher at 1360 S.W. 199th Ct., Aloha, Ore. 97005.

Micropolis Offers Floppy

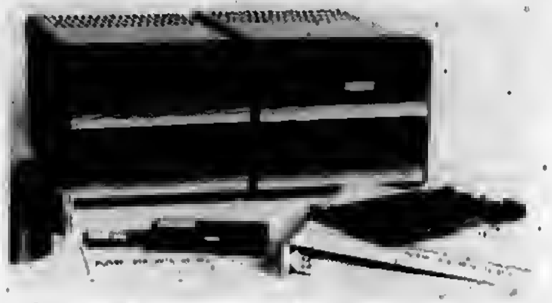
CANOGA PARK, Calif. — A 5-1/4-in. floppy disk system offering over 1M bytes of storage has been announced by the Micropolis Corp.

The Metafloppy 1054 Model II is made up of four drives in a dual/dual configuration, a controller, power supply, chassis, enclosure, cabling and a Basic software package. It will plug into any microcomputer using an S-100 bus and stores over 1.2 million 8-bit bytes in each unit, Micropolis said.

The drives feature an all-steel head positioner system and a referencing technique that minimizes the effect of any outside distortion.

Track-to-track access time is approximately 30 msec with data transfer rates up to 250 Kbyte/sec.

The Metafloppy 1054 costs $3,220 from Micropolis at 7959 Deering Ave., Canoga Park, Calif. 91304.



The Metafloppy 1054 provides over 1.2 million bytes of on-line storage.

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OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927, (916) 891-1420.

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900	2290	14,495	15,700	25,000
1200-1500	2550	24,995	27,000	32,000*
1500-1800	2470	26,995	29,500	32,000*

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IBM's Good Equal to Nation's: Memo

By Catherine Arnst
CW Staff

NEW YORK – "What's good for IBM is good for the country" was apparently the position taken within IBM during the mid- to late-1960s, according to documents released as part of the U.S. vs IBM antitrust trial.

The documents, which equate "national interest" with the firm's "financial interest", are part of a group of documents IBM has been fighting to keep from public view since the case began almost nine years ago [CW, Nov. 7].

The documents show that IBM used the criterion of "national interest" to justify preannouncing products and technologies not yet available in the marketplace.

However, there was a disagreement internally as to how to define "national interest" so that preannouncements could be made, since preannouncing was supposedly against company policy.

The issue has arisen in the trial because the government contends that IBM used early, selective announcements in order to maintain its monopoly position in the marketplace.

In January 1967, the issue arose when R.W. O'Keefe, director of financial analysis for the DP group, refused a request from the Swiss National Railways for information on automated railway control that was still under development at IBM.

O'Keefe said he did not think that situation had "the urgency that would require such a disclosure.

"My definition of national interest would be a situation which (1) involves the national defense and security [or] (2) is critical to health or welfare of the nation. I would also add the additional qualification that the disclosure is not available from other sources," O'Keefe said.

However, he was quickly answered by H. Bartow Farr, general counsel of the DP Group.

"If it is my responsibility to interpret national interest," he wrote, "I will do it as I have done in the past, i.e., financial interest is sufficient, no patriotism, health, welfare, etc. is required...Using the Robinson-Patman Act as an analogy, I have concluded and confirm my conclusion that there is no antitrust risk from defining national interest the way I have defined it," he stated.

CI Notes

Texas Department Store Selling Altair System

HOUSTON – Foley's, a department store chain here, is taking credit for being the first mass merchandiser to stock computers since it now offers a $4,995 Altair computer from Pertec Computer Corp. and a variety of software.

The Altair 8800b turnkey system with minifloppy disks will be sold for both business and home applications, according to Joseph Sternberg, Foley's divisional merchandise manager.

The applications programs that will be available from Foley's include a mailing list maintenance file, a small business check maintenance file, four games, a home check maintenance file and an auto log for car expenses.

Court Nixes CDC Contract For Pennsylvania Lottery

HARRISBURG, Pa. – A court here has invalidated Control Data Corp.'s contract for equipment and services used in the state's "Daily Number" lottery.

The award violated provisions of Pennsylvania state law calling for "fair, open, honest bidding," the judge said, after a complaint had been filed claiming that CDC was allowed to change its bid after open bidding.

The complaint was brought by General Instrument Corp., which claimed that a bid by its American Totalisator subsidiary was the low bid on the contract before CDC was allowed to change its quote.

The bidding will be reopened.

CCIA Joins Growing Opposition To Proposed I/O Link Standard

WASHINGTON, D.C. – The current implementation procedures of the proposed federal channel-level I/O interface standard "completely fail to achieve the intended benefits of this vital standard for either users, providers or the tax-paying public."

In a letter to the National Bureau of Standards (NBS), proposer of the latest version of the Federal Information Processing Standard (Fips), Computer & Communications Industry Association (CCIA) President A.G.W. (Jack) Biddle attacked the existing proposal.

In objecting to the current version of the proposed standard, the CCIA joined in opposition other notables such as Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee [CW, Oct. 31], and Norman Ream, former head of the NBS' Institute for Computer Sciences & Technology [CW, Sept. 12].

If properly drafted, such an interface standard could save the federal government about $150 million/year, Biddle said.

The current federal expenditures that would be impacted by the standard are about $700 million/year; and Biddle said it would be reasonable to expect a 20% to 30% decline in pricing of non-IBM-type peripherals, just as there has been in the competitive IBM-type market.

Attacking the standard, Biddle said, "We see absolutely no justification for a limitation on the number of channels that should conform to the standard. Every channel that is required for the interconnection of the CPU to its associated peripheral equipment should conform."

Currently, the revised version requires that one channel accommodate the standard with a maximum requirement of four such channels.

'CPU' Not 'System'

The CCIA would like the proposed standard to substitute "CPU" for the word "system" because this emphasizes to user agencies that they can acquire their CPU separately and competitively with standardized channel-level interfaces, software, maintenance and peripheral equipment.

The CCIA also disputed the clause that enables agency heads to waive the proposed standard. To do so makes a mockery of the entire Fips standardization process.

Adherence to an I/O channel-level interface standard is important because peripherals now represent 65% to 70% of the total system cost, Biddle observed, compared with 20% to 30% a decade ago.

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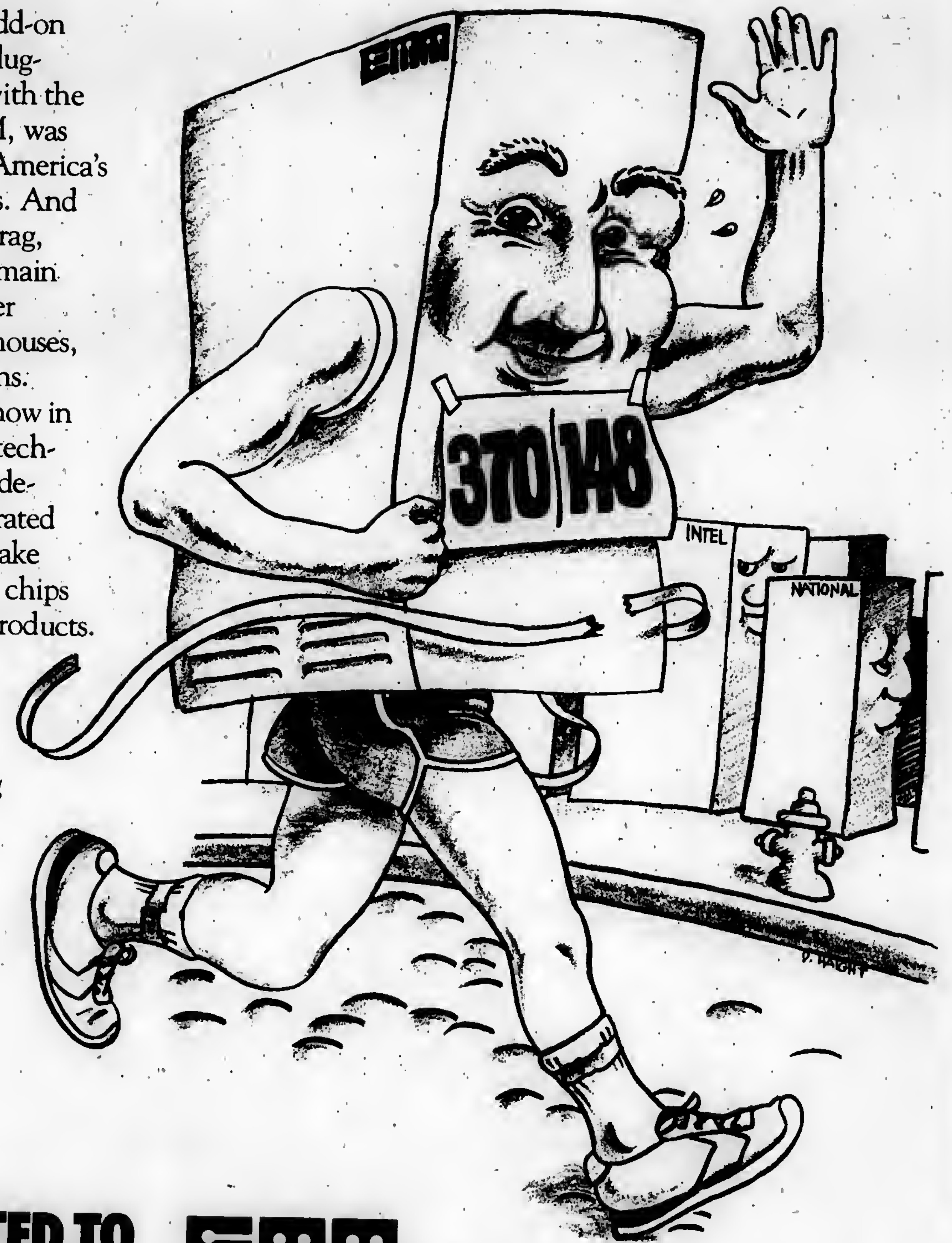

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After 13 Weeks

NCR Employees Vote to End Strike in Dayton

By Molly Upton
CW Staff

DAYTON, Ohio — The 13-week strike by NCR employees at its Dayton Terminal Systems Division and Microelectronics Division plants here is ending.

Members of the Auto Workers Local 1616 voted to accept the terms of a three-year contract that offers improved group and retirement benefits, an NCR spokesman said. All employees will have returned by the end of this week, he added.

The firm had previously decided to keep its microelectronics plant here open. But it was moving to shutdown the terminal plant.

The Dayton terminal plant is one of four NCR sites in the U.S. that produces financial terminals. Throughout the 13-week strike, NCR has declined to comment on its impact except to say that limited production had been maintained using nonstriking employees.

The terminal plants are principally assembly units, whereas the manufacture of much of the circuitry is done by the microelectronics plants, an NCR spokesman said.

The data presented by NCR showed that its labor costs for the Dayton Terminal Systems Division are nearly $1/hr higher than for other similar plants in the U.S.: $5.01 vs. $4.03, he said.

Retirement Issue

One of the key areas of disagreement between the United Auto Workers Local 1616 and NCR was early retirement, the NCR spokesman said.

The average age of the Dayton Terminal Systems Division's employees is 53, because when NCR began its conversion from electromechanical to electronics products, the labor content was reduced and the unions applied the principal of seniority leaving NCR with the older employees, he said.

New Agreement

The new agreement, ratified by a vote of 519 to 220, includes a minimum wage rate of $5/hr and a grow-in feature for pension support.

Under the new contract, employees reaching age 54 and 25 years of service during the contact term are eligible for the benefits, whereas previously, they had to be 54 and have worked for 25 years at the beginning of the contract term.

Also, the contract lets employees receive group benefits through the age of 65 and provides extended group benefits to those laid off, he said.

Previous Negotiations

During the previous contract negotiations, the union accepted a lower wage rate than what it had been receiving, so "there has been a great deal of labor difficulty," the spokesman observed.

The Dayton Terminal Systems Division had about 650 employees on strike and about 750 more nonunion employees, he said.

Plant Locations

The other terminal plants are in Cambridge, Ohio; Ithaca, N.Y.; and Millsboro, Del., he added.

The firm determined that it was economical to continue operating the Microelectronics Division plant in Dayton, he said.

Although NCR does not supply all of its own semiconductor needs, it does supply a fair amount, he indicated. Also, the firm has special requirements that it can satisfy through its own manufacturing facility, according to the spokesman.

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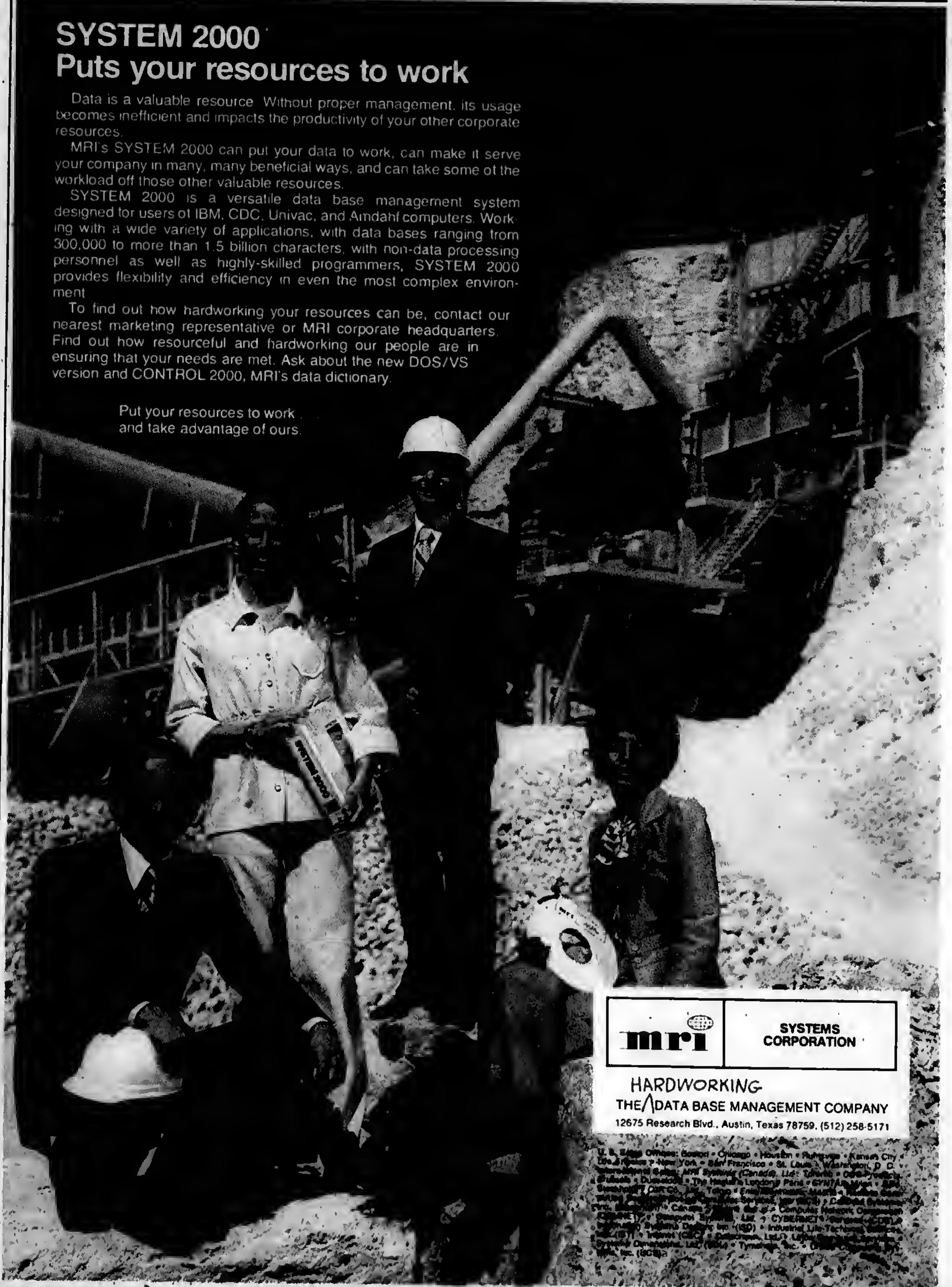

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GA Moving From OEM to Packaged Systems

By Molly Upton
CW Staff

NEW YORK — General Automation, Inc. is making the transition from an OEM systems house to the producer of packaged systems for the multiple unit buyer, according to Marv Silverman, manager of systems marketing.

Currently the firm's only entry in the small business marketplace is the 440 Data Series (DS) but Silverman said he intends to expand that line with the 110, 220, 330 and 550, which are currently marketed on an OEM rather than systems basis.

The firm intends to have total upward compatibility throughout its line of packaged systems, he said, and plans to add to its range of offerings and peripherals.

For example, the 440DS will be available with the IBM 2780 communications feature and eventually the 3270, he said, but the integration of the feature into he system first has to be thoroughly checked out.

Other enhancements for the 440DS are likely to include semiconductor-memory, capacity beyond 128K, the addition of virtual storage and higher speed tape drives, he said.

The firm now has some virtual 440s at beta test sites, he indicated.

Eventually Silverman sees users incorporating 440s into a network and off loading IBM 370s.

In addition, the firm has implemented the IBM Synchronous Data Link Control (SDLC) protocol for Wells Fargo Bank's participation in the Swift network, so that capability could potentially be added to the standard product line, he said.

Currently a development 440 system, which includes operating software, costs $45,000 and features one 10M-byte disk, a 200 line/min printer, a 400 card/min card reader and two CRTs.

The system can have up to six CRTs with a 10M-byte disk and up to 16 with 80M bytes.

The software includes Cobol, a multiple terminal capability, a file management system and the Control 3 operating system. Of the 128K of core, half is available to the user and compiling takes only two of the 16K partitions, Silverman said.

To handle the change in marketing direction from custom-built items to emphasis on selling packaged systems, GA is beefing up its sales force, field service and software support, Silverman said.

OEM sales during 1978 should continue to climb and packaged sales should show a sharp rise, while custom systems business should decline, he predicted.

Since GA has concentrated responsibility for packaged systems, data series, industrial products and peripherals under Silverman, the firm should be able to cull particular features from its custom products for inclusion in the packaged and OEM offerings, he said.

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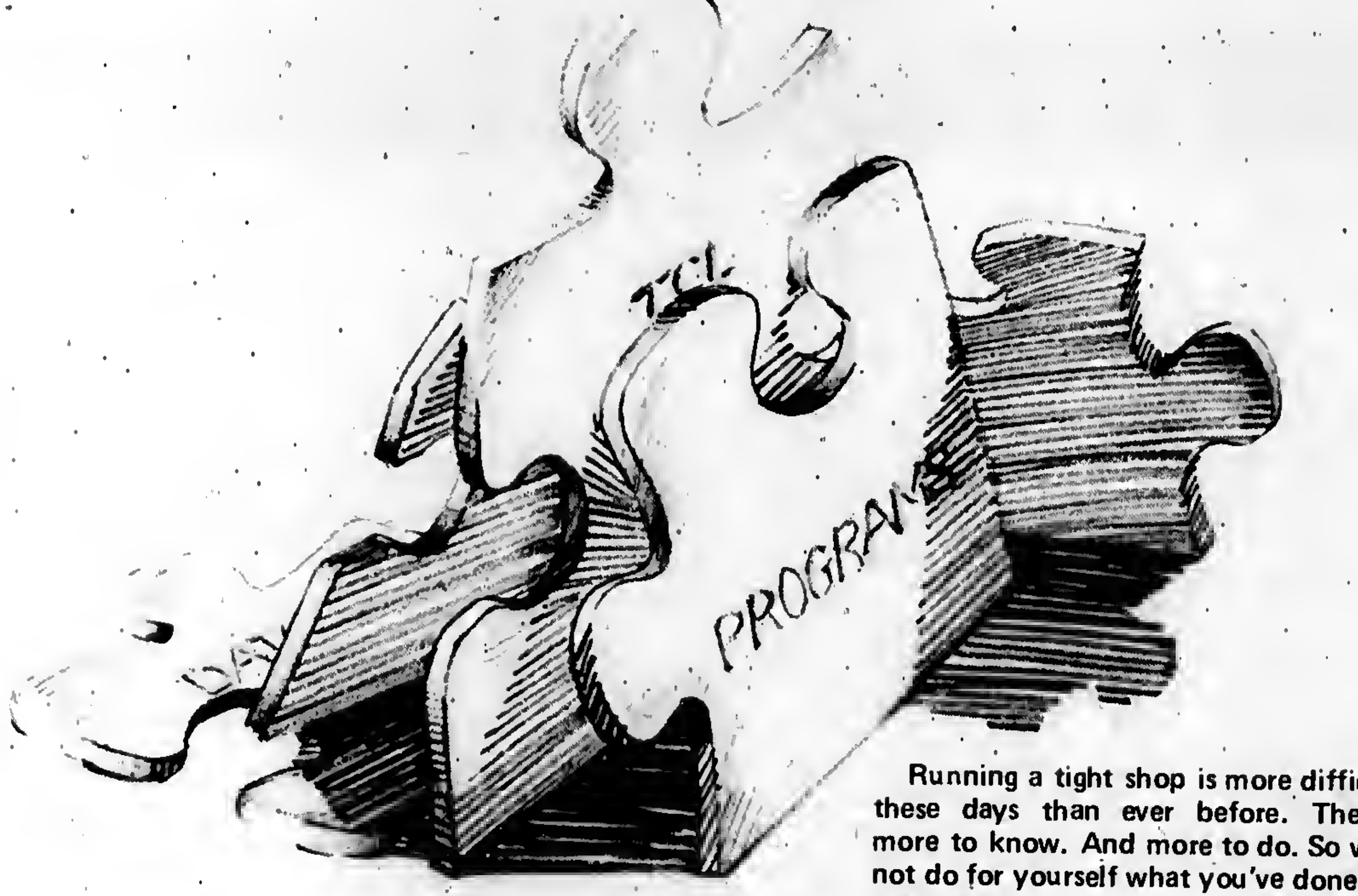

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Contracts

Distronics Corp. has received a contract from Nicklas Supply Co. to supply the firm with a DP system to automate business operations.

Datatrol, Inc. has received a contract from the state of Rhode Island to develop, implement and operate a computerized on-line "Daily Numbers Game" for the Rhode Island Lottery.

RCA American Communications, Inc. has been awarded a contract by the National Aeronautics and Space Administration (Nasa) for satellite communications links to support NASA's Space Shuttle Program and its Tracking and Data Relay Satellite System.

Storage Technology of Canada, Ltd. has been awarded contracts by the Quebec government for the installation of magnetic tape subsystems in the government's seven computer installations located in six different departments in Quebec City and Montreal.

Kennedy Co. has been awarded a contract by Cygnet of Montreal, Canada, for Kennedy's Model 9300 tape transport and associated controllers.

Hazeltine Corp. has received a contract from the U.S. Army's Electronics Command, Fort Monmouth, N.J., for 17 AN/TPX-46 IFF Ground Interrogator Systems and associated test and data items.

General Electric's Information Services Division has received a contract from Hospital Corp. of America (HCA) for the processing of HCA's management systems for the health care industry.

Business Systems Products, Inc. has been awarded a contract by WEI Corp. to install and maintain a computer system to automate the manufacture of heat dissipating components.

The Foxboro Co. has been awarded a contract by Wyeth Laboratories, Inc. for a computer-based process control system.

Texas Instruments, Inc. has received a contract from PRC Electronics, Inc. for Silent 700 data terminals.

Metrodata, Inc. has received a contract from the Kuwait Ministry of Electricity and Water to supply computer-controlled tank-level and pump control systems.

Fisher Elected Chairman

Wema Forms New England Group

FRAMINGHAM, Mass. — The Western Electronics Manufacturers Association (Wema) has formed a New England Council with 35 members.

At the group's first meeting here, Kenneth G. Fisher, president of Prime Computer, Inc., was elected chairman of the New England Council.

The New England unit is represented on the Wema board of directors by Fisher as well as by Edson de Castro, president of Data General Corp., who is a director at large.

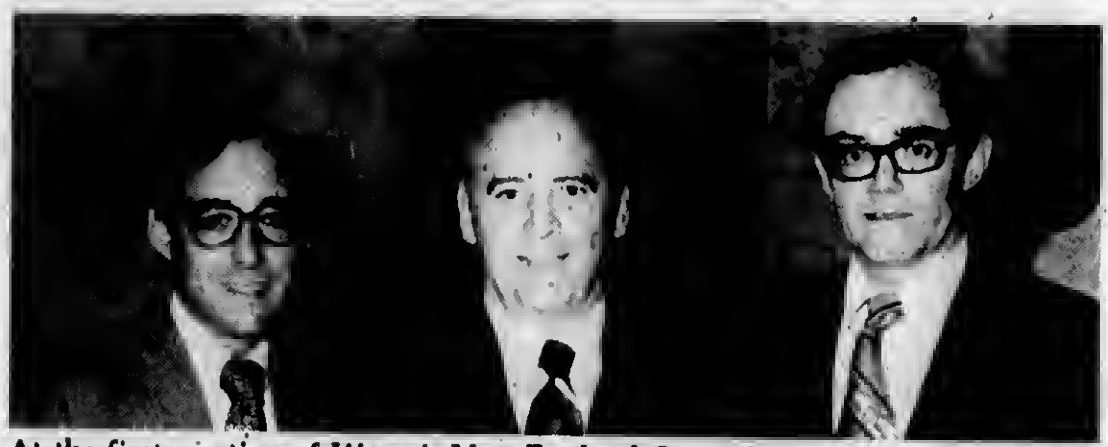
The new members have expressed their interest in the business climate in Massachusetts, particularly those aspects that affect a firm's ability to attract employees.

DG has found it is much easier to attract programming talent to its site in North Carolina than to its operations in Massachusetts, according to De Castro.

Fisher mentioned that a survey indicated MIT graduates are not enthusiastic about remaining in Massachusetts because of the income tax situation.

The Wema membership includes 1,100 electronics firms in 34 states.

Further information on the New England Council can be obtained from Ken Ritchie, The Fairways, Rte. 122, Amherst, N.H. 03031.



At the first meeting of Wema's New England Council, Ken Oshman, president of Rolm Corp., met with Kenneth Fisher, president of Prime Computer, Inc. and Edson de Castro, president of Data General.

Micro Makers Form Unit

PRINCETON, N.J. — The Microcomputer Manufacturers' Association has been formed to handle areas of mutual interest, such as the prevention of conflicting dates for shows, according to Chris Rutkowski, president of Technical Design Labs, one of the group's organizers.

The area of most immediate concern is the scheduling of shows, he said. After that the association will probably undertake projects in such areas as setting standards.

For further information, contact Rutkowski at Technical Design Labs, Research Park Bldg. H, 1101 State Road, Princeton, N.J. 08540.

Service Group Now 435 Strong

DANBURY, Conn. — The Association of Field Service Managers, formed in August 1976, has grown to 435 members from 94 different organizations, according to Executive Director Thomas Ross.

The purpose of the organization is to develop maintenance management of sophisticated technologies as a separate management function, he explained.

As part of its objectives, the group seeks to improve product performance, operate service as a business, develop service professionals and improve service organization effectiveness.

The AFSM plans to conduct seminars and workshops and assist in the development of formal field service programs in colleges as a means of increasing the professionalism associated with the service industry.

The organization has nine active chapters throughout the U.S. and expects to form three more before the end of the year, he added. It also plans to form one in England, he added.

Individual membership dues are $75. For further information write AFSM, P.O. Box 255, Danbury, Conn. 06810.

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Financial News

In Three Months Net

Amdahl Tops $6 Million

MONTEREY, Calif. — Amdahl Corp. earned $6.4 million on revenues of $46.4 million in the quarter ended Sept. 30, according to a condensed balance sheet released to security analysts meeting here at the recent Western Electronic Manufacturers Association conference.

Outright sales accounted for $44.7 million of the revenues. Lease and maintenance revenues totaled $1.7 million.

For the nine months, Amdahl showed earnings of $27.6 million on revenues of $129.6 million; $125.4 million of the revenues came from outright sales.

On a fully diluted basis, the earnings per share were $.80 for the three-month period and $3.53 for the nine months.

For the nine-month period, the condensed balance sheet showed an extraordinary credit of $9.9 million as the result of a tax benefit from a net operating loss carryforward. However, no credit was taken for the quarter ended Sept. 30.

That extraordinary item accounted for $1.25 per share on the nine-month earnings, according to the statement.

Banner Year for DG

WESTBORO, Mass. — The year 1976 was a banner one for Data General Corp., which reported record earnings and revenues for the 12 months ended Sept. 24.

Earnings rose to $28.6 million or $2.88 a share compared with $20.8 million or $2.11 a share in the previous year. Results were restated to include Digital Computer Controls, Inc., which was acquired on a pooling-of-interests basis.

Revenues grew to $254.7 million compared with $178.8 million last year.

For the final 16 weeks, earnings totaled $9.9 million compared with $7.5 million in the year-ago period. Revenues surged to $87.5 million compared with $63.5 million.

During the year, DG's employment rose to 8,590 from 6,190, using 1976 figures restated to include DCC.

Shipments of computers grew to 3,400 from 3,100, the firm said.

Memorex Earnings Up 35%

SANTA CLARA, Calif. — Memorex Corp.'s operating earnings rose 31% and revenues were up 35% during the third quarter ended Sept. 30.

Before tax credits, Memorex's operating earnings reached $8.4 million compared with $6.4 million in the year-ago period. Including a $5.7 million tax credit, quarter earnings totaled $14.1 million or $2.19 a share compared with $10.3 million or $1.80 a share in the 1976 period, when there was a $3.9 million credit.

Revenues reached $114.1 million in the quarter compared with $84.3 million in the same period last year.

For the nine months, the firm earned $40.9 million or $6.10 a share, including a $16.3 million credit, compared with $28.5 million or $4.55 a share, including a $10.8 million credit, in the year-ago period.

Nine-month revenues totaled $326.1 million compared with $244.6 million in the same period last year.

The nine-month figures for 1977 include the operating results of Business Systems Technology.

Memorex said it reduced its total debt by $5.5 million in the quarter from $148.9 million to $143.4 million. Cash and temporary investment balances at the end of September dipped to $35.8 million from $40.2 million a year ago.

Total shareholders' equity increased to $98 million from the $80.9 million reported at the end of the second quarter, the firm said.

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

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Nickels & Dimes

Control Data Corp. expects data services revenues, which are growing at a compound rate of over 20%, to reach $300 million in 1977, according to Robert M. Price, president of the firm's computer group.

The market for data services is now about $6 billion to $7 billion and should reach about $11 billion by 1980 in the U.S. and Western Europe, he said.

Sales of peripheral products were up 32% in the first three quarters of the year compared with the same period last year.

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IBM declared a regular quarterly dividend of $2.50 per share on common stock payable Dec. 10 to holders of record Nov. 9

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Storage Technology Corp. is offering to repurchase the total outstanding amount of convertible subordinated notes due 1993 through Nov. 14, which could cost the firm $7.9 million.

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CDC Units Read, Sort Micr Documents

MINNEAPOLIS – Control Data Corp. has announced two magnetic ink character recognition (Micr) document-processing units that it said can read and sort encoded checks, credit card charges, etc. at over 35,000 document/hour.

The 92660 reader/sorter separates magnetically encoded documents according to predetermined sets of characteristics and sorts similar groups into six individual pockets.

The 92660 can process intermixed documents of various sizes that meet American Banking Association specification at rates up to 830 6-in. document/min, CDC said.

The unit can be remotely located and costs $28,000 in single quantities.

The larger 92680 has 14 document pockets and can handle optical character recognition and optical mark reading at the same time it is reading and sorting magnetically encoded documents, the firm said. Options for the unit include off-line sort and outsort/edit, which verifies documents, CDC said.

The 92680 costs $58,000, it added, and quantity prices are available for both units. CDC can be reached through P.O. Box O, Minneapolis, Minn. 55440.

Control Data Corp.'s Model 92660 reader/sorter reportedly sorts over 35,000 documents per hour.

OEM Products

Talos Unwraps Digitizer

SCOTTSDALE, Ariz. – Talos Systems, Inc. is offering a digitizer for the OEM market which has an 11-in. by 11-in. active surface area.

The Simple One is a self-contained unit with stylus priced at $995 in quantities of 100. It can replace joysticks, lightpens and trackballs for CRT cursors as well as provide precision graphics capability, according to the firm.

The Simple One combines benefits of source data entry, menu selection and display manipulation with precise graphic data input, the firm addd.

The unit has 200 line/in. resolution and ± .02 in. accuracy. A 16-bit binary interface is standard, but an RS-232C costs $200 in single unit or $145 in quantity.

Talos Systems, Inc. is at 7419 E. Helm Drive, Scottsdale, Ariz. 85260.

VRC Memories Hold 37.9M Bits

N. SPRINGFIELD, Vt. – Vermont Research Corp. is delivering fixed-head memories that have a 37.9M-bit storage capacity and access time of 8.5 msec.

The 4016-DC, designed for use in telecommunications systems where power interruptions cannot be tolerated, operates on 48 VDC input power.

The Model 4016-DC costs $13,390 and the AC unit is $12,370 when purchased in quantities of 100 per year from the firm at Precision Park, North Springfield, Vt. 05150.

Impact Printer Bows

NEW YORK – C. Itoh Electronics, Inc. has announced a 40-column dot matrix impact printer with guaranteed continuous duty head life of 100 million characters.

Printing speed is 2.5 line/sec and the price in sample quantities is $210 each for the second-generation Series 500 units.

C. Itoh is at 280 Park Ave., New York, N.Y. 10017.

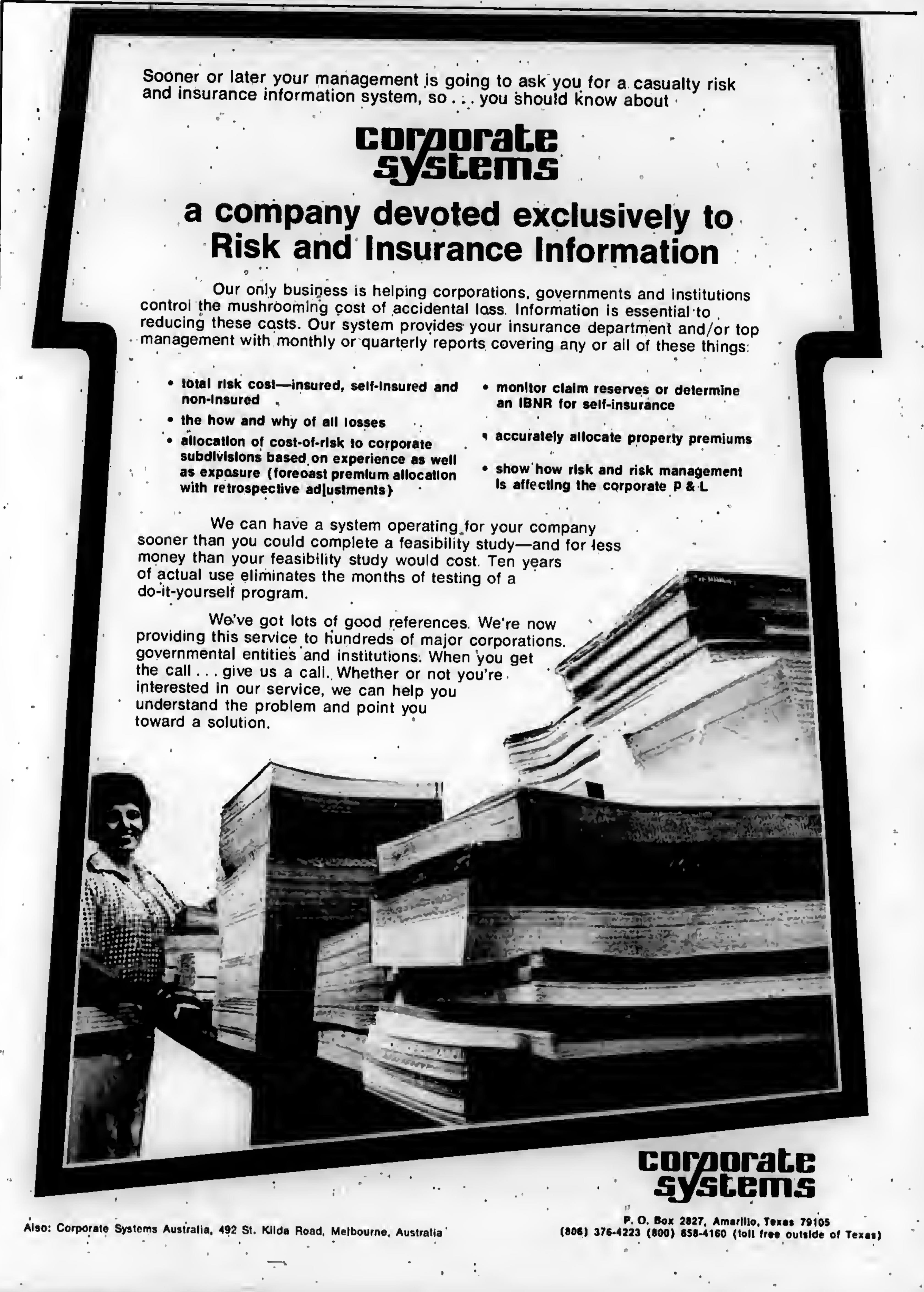
Part & Parcel

A large alpha numeric LED matrix display called "Datablox" has been introduced by Chicago Miniature Lamp Works for use in illuminated displays. The Datablox provides alphanumeric digits 4 in. by 3 in. and uses 35 (5 x 7 matrix) high-intensity LEDs mounted in individual reflectors. The cost is $60 each or $40 per 100 from 4433 N. Ravenswood Ave., Chicago, Ill. 60640.

• • •

Maxi-Switch Co. has introduced a Selectric-style keyboard that can also be ordered with a 12-key numeric pad.

The basic keyboard cost is $115 in small quantities from 9697 E. River Road, Minneapolis, Minn. 55433.



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Intel 8-Bit Micro Costs $3

SANTA CLARA, Calif. — Intel Corp.'s Microcomputer Division has announced an 8-bit microcomputer that costs $3 in large OEM quantities.

The 8021 single-chip system contains an 8-bit control processor with a 10 microsec instruction cycle time, the firm said.

The 8021, which has been optimized for control applications, is the low end of the MCS-48 microcomputer product line. It executes over 60 different instructions, a subset of the 8048 instruction set, with no instruction requiring more than two cycles to execute, Intel said.

The 8021 also has 64 bytes of read/write data memory, 1K byte of program memory, 21 I/O lines and all other generally required functions such as programmable interval timer/event counter and system clock and oscillator, the firm said.

The 8021 can operate off dc voltage in the range of 4.5V to 6.5V. Programs are stored in masked read-only memory.

Microcosm

The unit has an on-chip oscillator that can be externally synchronized with a crystal or a TTL-level clock signal, Intel said.

Product development is supported by the other MCS-48 features and by the EMB-21 emulator board, the firm said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Rockwell Adds 32K Static ROM

ANAHEIM, Calif.— A 32K static n-channel read-only memory (ROM) has been designed by Rockwell International to support the company's R6500 microprocessor family and to be compatible with other microprocessors.

The RS2332 features a typical access time of 250 nsec and uses 350 mW of power. One +5V power supply is required, the firm said.

Asynchronous Operation

The unit operates totally asynchronously and requires no clock input and is organized with 4K words by 8 bits.

The RS2332 has the same pinout as the 2316 ROM with pin 18 being an address pin instead of a chip select.

Packaged in a 24-pin plastic package, the Rockwell R2332 is priced at $20.10 in quantities of 1,000.

Rockwell is at 3310 Meraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Astral Offering One-Board Unit

PALO ALTO, Calif. — Astral Computer Co. is offering the 2000 microcomputer, which is based on the 6800 microprocessor. The unit is available as a single-board computer or in a case complete with power supply and mother board.

Separate cards contain the processor, memory, I/O and floppy disk interface.

System Support

The system is supported with extended 8K Basic, assembler, a text editor and disk operating system, Astral said.

The processor provides direct memory addressing through cycle stealing, a spokesman added.

The 2000 with Astral Basic on erasable programmable read-only memory and one 8K random-access memory board costs $2,450 each for less than nine units and $1,600 each for over 50 units from the firm at Suite 2, 991 Commercial Street, Palo Alto, Calif. 94303.

System Debugs Pace Designs

SANTA CLARA, Calif. — The Low-Cost Development System (LCDS) from the Microcomputer Group of National Semiconductor Corp. lets engineers develop, test and debug Pace hardware and software designs for a basic cost of $585.

The Pace LCDS card consists of a 16-bit Pace microprocessor, 1K words of random-access memory (RAM), sockets for 1K words of programmable read-only memory (Prom), a 20-key dual-function keyboard, a six-digit LED display, a system-timing element, input/output buffers and bidirectional transceiver elements.

The Pace LCDS is priced at $585 each while the IPC-16C/011 RAM cards cost $170 each.

The IPC-16C/012B Prom cards with blank sockets cost $139 and the IPC-16P/802 cable assembly $145.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Futuredata System Tests Two Micros

LOS ANGELES — Futuredata Corp. is offering a system that it said permits testing of two different microcomputer-based systems simultaneously.

The Universal Dual Microcomputer Development System consists of two tape-based 8K systems including two CRTs, keyboards, tape units and operating software and manuals.

It costs $5,850 and includes a choice of 8080, 6800 or Z80 microprocessors for each half of the system.

Futuredata, which was formerly Microkit, Inc., is at 11205 S. La Cienaga Blvd., Los Angeles, Calif. 90045.

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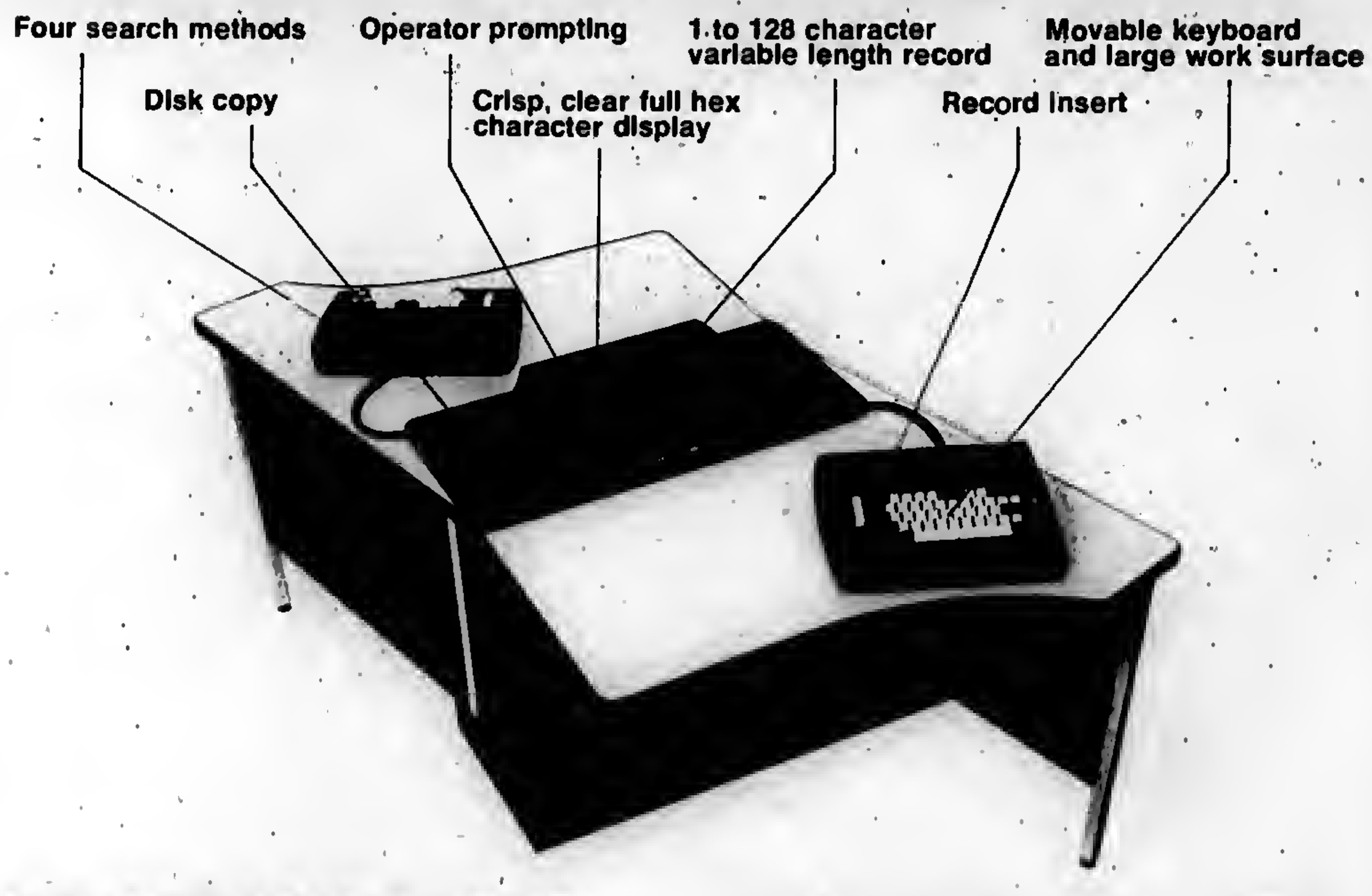
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Decoders Eliminated

National Cards Aid Control System Design

SANTA CLARA, Calif. — National Semiconductor Corp.'s SC/MP-II family of microcomputer CPU, read/write memory and read-only memory boards is said to reduce overall system costs by incorporating features that eliminate decoders, latches and other external devices normally required for control systems.

The ISP-8C/100N CPU gives 1 microsec per microcycle instruction-execution and requires a single +5V power supply, the firm's Microcomputer Systems Group said.

12-Bit Address Bus

Although the SC/MP-II processor is an 8-bit device, communications between the CPU and memory/-peripherals are through a 12-bit address bus and an 8-bit bidirectional data bus, the firm said.

Built-in logic allows multiprocessor and direct memory access applications. The unit also has single-bit control and sense lines build into the chip, the firm said.

In quantities less than 10, the ISP-8C/100 CPU boards cost $250 and the ISP-8C002N board with 2K by 8 bits of random-access memory costs $160. The ISP-8C/004P programmable read-only memory (Prom) card, with 4K by 8 bits, costs $525.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

Intel Has 16K RAM Family

SANTA CLARA, Calif. — Intel Corp. has unveiled its second family of 16K-bit random-access memories (RAMs), the 2117, which provides direct replacements for all types of first-generation 16K RAMs, the firm said.

The 2117 is based on the same N-MOS process used to produce the Intel 2116, but the chip design gives the 2117 the highest performance achieved to date in producing 16K RAMs, Intel claimed.

Other Models

The 2117-2 has 150-nsec maximum access and 320-nsec read or write, while the 2117-3 with 200 nsec maximum access has 375-nsec read or write. The 2117-4 has 250-nsec maximum access and 410-nsec read or write, the firm said.

The 2117 replaces the latched 2116 as well as the unlatched 4116 and a system designer can use a new 2117 clock mode that provides the equivalent of a latched output, the firm said.

In quantities over 100, the 2117-2 costs $55, the 2117-3, $41, and the 2117-4, $39. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Zilog Adds 4K Static RAM

CUPERTINO, Calif. — Zilog, Inc. has expanded from microprocessors into the realm of memories with production of its 4K static random-access memory (RAM), the Z-6104, which the firm said has access time of 200- and 250 nsec.

The Z-6104 is pin-compatible with Mostek's MK 4104, Zilog said.

Zilog said it plans to offer the Z-6104 with an access time of 100 nsec.

The 200 nsec RAM costs $22 in quantities of 100 to 999 in ceramic packages and the 250 nsec version is priced at $20.

Zilog is at 10460 Bubb Road, Cupertino, Calif. 95014.

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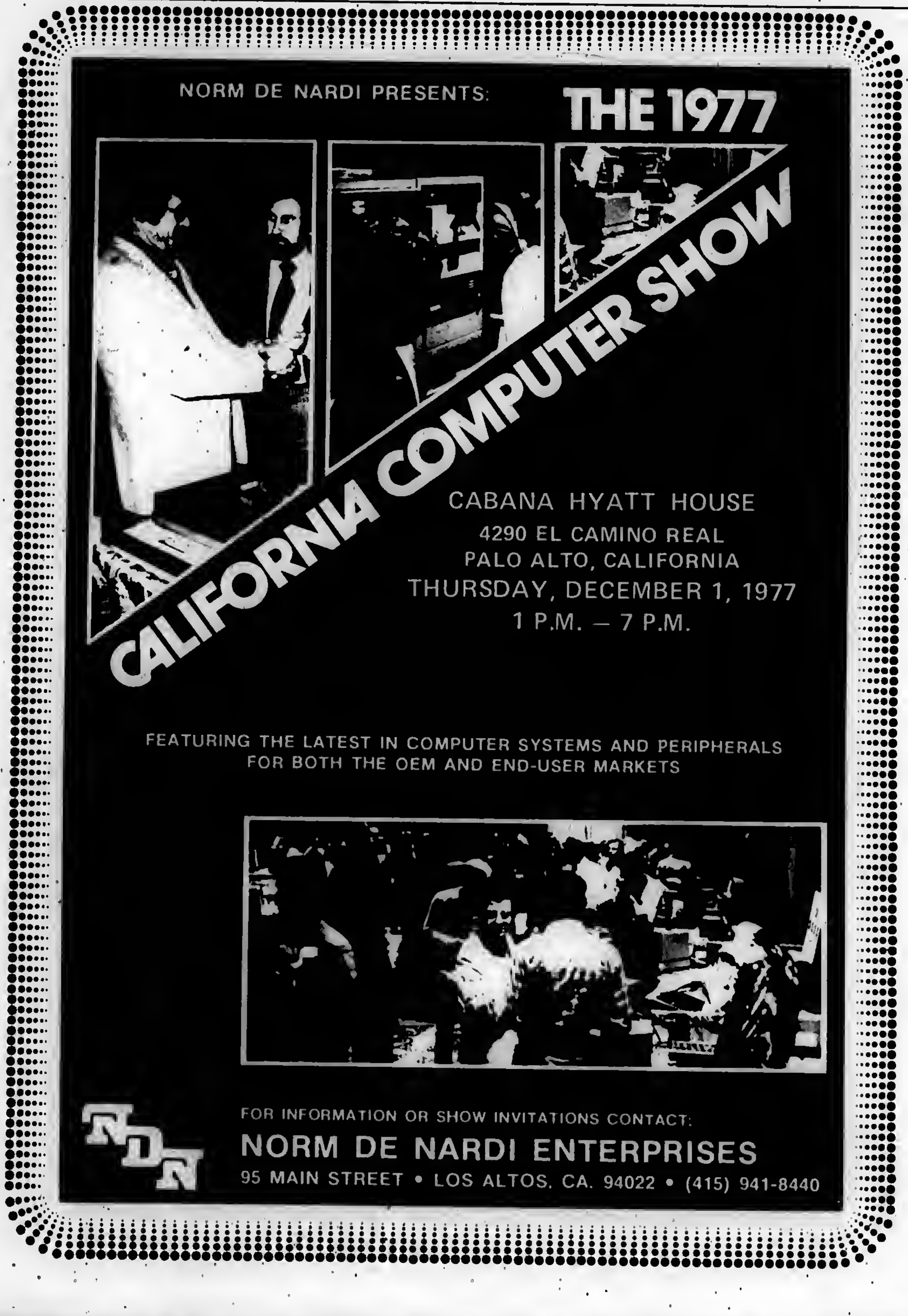

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B.J. Johnson & Associates, 2503 Eastbluff Drive, #203, Newport Beach, Calif. 92660 (714) 644-6037.

Rockwell Extends PPS Line

ANAHEIM, Calif — Rockwell International has expanded its line of PPS-4/1 one-chip microcomputers with the PPS-4/1 Model MM76C, which incorporates a programmable high-speed counter/timer.

The P-channel unit can "crunch numbers" or control functions and simultaneously count inputs, events, perform timing and program fixed intervals, among other operations, Rockwell said.

It has five input control lines and 32 I/O ports that include serials I/O capabilities that in combination with an on-chip clock circuit enable it to be directly synchronized with or by another microprocessor system.

The MM76C uses the MM76 instruction set and the same assembler program. The functions of two instructions are redefined to program the 14 different operating modes.

The one-chip microcomputer also contains a 48 by 4-bit random-access memory and a 640 by 8-bit read-only memory, Rockwell said.

The Rockwell PPS-4/1 MM76C is priced at $3.90 each for a minimum quantity of 1,000. In large quantities, prices drop to less than $3.

Rockwell is at 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

National Unveils RAM-I/O Chip

SANTA CLARA, Calif. — National Semiconductor Corp. has developed a combined random-access memory (RAM) and I/O chip designed for low-end systems that may require relatively small memory but need a number of peripheral interfaces.

The INS8154, an n-channel, 40-pin circuit, contains 128 8-bit words of static RAM and two 8-bit parallel I/O ports that are bit-programmable, the firm said.

Each I/O pin may be defined as either input or output.

The circuit interfaces directly with SC/MP II, INS8080A and other National Semi microprocessors, the firm said.

The INS8154 costs $8.75 in plastic in lots of 100 or more from National Semiconductor Corp. at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

MMI Offers 8K ROMs With 55 Nsec Access

SUNNYVALE, Calif — Monolithic Memories, Inc. (MMI) has 8K bipolar read-only memories (ROM) with a 55 nsec access time priced at $10 each in volume. The first time masking charge is $750 per pattern in minimum quantities of 100.

The three versions are 20-, 22- and 24-pin packages, all designed as replacements for other vendors' memories.

MMI is at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Synertek's 32K ROM Has 450 Nsec Access

SANTA CLARA, Calif. — Synertek has introduced a 32K read-only memory (ROM), the SY2332, which it said features an access time of 450 nsec.

The SY2332 is organized as 4K words by 8 bits, requires a single 5V power supply and is completely TTL compatible, the firm said.

Available in either ceramic or plastic 24-pin packages, it costs $35 each in quantities of 100 to 999. There is a one-time tooling fee of $750 to $1,000.

Synertek may be reached through P.O. Box 552, Santa Clara, Calif. 95052.

Low Cost Card Punch and Card Reader for DEC HP DG IBM Computers

The CCC 1700A Keypunch Interface can connect your computer, time-share terminal, or any bit serial communicating device to an IBM 129 or 029 Keypunch so it will both punch *and* read data cards! It's EIA compatible, converts ASCII or any bit serial code to Hollerith when punching, converts Hollerith to ASCII or any bit serial code when reading, and permits the efficient transfer of data through a 900 character buffer. The 1700A operates at all standard baud rates from 110 to 9600. And it requires no special software drivers; standard Basic or Fortran "PRINT" or "WRITE" statements work just fine!

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Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software. Prefer a minimum of 3 years' experience in structured design, coding, testing and documentation of programs; development with large data base on multi-file computers and real-time systems, HIPO design documentation, TSO usage and software simulation techniques. Requires a BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1, Fortran, Assembler, Intel 8080 and PDP-11 programming languages.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

TELETRAFFIC & PLANNING ENGINEER

Responsible for the analysis of teletraffic probability and queuing problems on digital and analog switching systems and the development of computer programs for switching systems. Perform control and route reliability studies, define and analyze problems for future systems features and their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specification, and exposure to switching system specifications. Requires a BS or MS in Electrical Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

MINI-COMPUTER PROGRAMMERS

We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing mini-computers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

If unable to call, send resume including recent salary history to:

Manager of Technical Employment, Dept. 471 A6

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Data General Needs: Senior Software Specialists.

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The positions listed below are available in Westboro, one of our R & D centers and our Corporate Headquarters. We are surrounded by forested hillsides, with mountains to the west and north and the sea to the east. Westboro is less than an hour from the educational, religious and cultural capitol of the U.S. – Boston.

These positions exist in a creative environment where meaningful challenge and reward can be key elements in your future.

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This position requires a creative programmer who will work with engineers in the development of microprocessor based state-of-the-art terminals. In addition to designing software, this person will be expected to contribute architecture concepts that will maximize software performance. Requires experience in assembly language programming, preferably in a variety of microprocessors. Should have experience in product development.

Commercial System Programmers

These positions involve system programming for Data General's new and extremely well-received CS product line, with emphasis on advanced utility development. These professionals must be willing and capable of undertaking assignments in a variety of areas with a readiness to assume group leadership responsibility. These positions require a BS or MS in CS, EE, Math or Physics with emphasis on computer engineering. Requires small computer assembly language programming experience; with DG NOVA experience very desirable. Knowledge of COBOL would be useful.

Diagnostic Engineering-Programming

These rewarding positions represent a few of many new opportunities in our ever expanding Corporate Diagnostics Department. Our great emphasis on vertical integration creates an unending stream of new career opportunities in this field. You may choose one of several paths of project expansion and personal advancement. You will design, code and document diagnostic software. You will be expected to write, coordinate and execute project test plans with complete responsibility for diagnostic testing projects.

Openings are available in:

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Disc Peripheral Diagnostics
CPU, Memory and Floating Point Processor Diagnostics
Communications, SDLC Diagnostics.

These positions require a BS or MS in EE or CS with 5-10 years experience in assembly language and/or microcoding plus a hardware background.

If one of these positions could be a logical next step in your career, send your resume in strict confidence to: Jim Kimbrough, Technical Personnel Representative, Data General Corp., 15 Turnpike Road, Westboro, MA 01581. Or call: (800) 225-7347, ext. 5773 outside Mass.; (617) 485-9202, ext. 5773 in Mass.

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Hewlett-Packard 3000
Senior Analyst/Programmer Analyst

This major chemical manufacturing corporation is seeking two professionals to develop and install systems in an on-line multi-terminal minicomputer environment at our plant near Baton Rouge, Louisiana. Hardware will be HP 3000 Series II using COBOL, SPL, and Image Data Base.

The Senior Analyst will operate as the project leader of a small team and assume total responsibility for the installation, start-up, and continuing support of a large HP 3000 minicomputer system. Initial development effort will be in Inventory and Purchasing areas.

Requirements include a related degree and 2-3 years minicomputer experience, HP 3000 preferred.

Salary will be commensurate with qualifications. For confidential consideration forward resume including salary history to:

Department AJC

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Santa Barbara ,California

Raytheon Electromagnetic Systems Division, located in the beautiful Santa Barbara California area, has immediate openings in the following areas:

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Define NTOS/EW interface requirements and design and develop associated software. Design and develop diagnostic software for a large scale military EW-system. Requires BSEE or Computer Science degree with experience in real time development and FORTRAN programming.

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Perform sub-system design and analysis of computer controlled ESM/ECM systems. Will be responsible for development of system error budgets and analysis of system performance. Requires coordination with design groups.

Please send resume with salary history to:
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$22 - 30,000

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To be considered for this management position or as an individual contributor to this growing department, contact Ted Chaloner, Steve Ford or Dennis Fitzgerald at (617) 426-4180 or submit your resume to us. All responses will be treated with the highest confidentiality. Please include salary when submitting resume.

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Exciting state-of-the-art development opportunities are available for systems programmers who want in-depth insight into the workings of our systems. Areas in which you will be involved are: cross assembler development, macro-processor development and, the general development and enhancement of Programming Development Systems. These positions require a minimum of 3-5 years system experience and familiarity with the PDP-11 70. Exposure to the UNIX Operating System is highly desirable.

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If absolute privacy is essential, please call Mr. Dugan at 237-2100 between the hours of 5 pm and 6 pm
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SYSTEMS ANALYSTS
PROJECT LEADER
SENIOR PROGRAMMERS

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TECHNICAL EMPLOYMENT
Department 10

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Responsibilities for this position include the design and implementation of communications software for a family of mini-computer based real-time operating systems including the continued development of remote batch, remote process control and networking systems. Applicants must be experienced in assembly language programming in a mini-computer environment and have a thorough understanding of real-time operating system structures. They must also be experienced with communications hardware and communications protocols such as BYSNC, SDLC and X-25.

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Attn: W.D. Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309.

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Eastern Washington University, near Spokane, has an opening for a Systems Analyst/Programmer with a minimum of two years programming experience, including some systems analysis work, using COBOL. An appropriate degree is preferred, but, experience may be substituted for educational qualifications. Duties include development of design specifications and writing complex program instructions for administrative systems development. Duties will be performed at a State-wide Service Center located on one of the Northwests' most beautiful University campuses. Salary to 18K with excellent fringe benefits. Apply by Nov. 23, 1977 to Personnel Director, Eastern Washington University, Cheney, WA 99004. An Equal Opportunity Employer, (M/F).

ANALYZE THESE CAREERS!

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★ SYSTEMS ANALYSTS

Candidates should have a minimum of 5 years experience in programming and a minimum of 3 years Systems Analysis/Design. Baccalaureate or advanced degree in Computer Science is required. Responsibilities would include the design and maintenance of highly specialized commercial and engineering application systems. Exposure to distributed information processing utilizing mini-computers and general knowledge of telecommunications would be an asset. Successful candidates must be flexible and willing to relocate.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years commercial or engineering applications programming experience and a minimum of 1 years' exposure to application system design. BS/BA degree in Computer Science or any field with demonstrated exposure to computers and data processing is required. Responsibilities would include application system design, programming, installation and post-installation support for standard domestic and international field data processing systems. Knowledge of any one or all of the following: FORTRAN, COBOL, BASIC, APL, and/or Machine Language. Exposure to major operating systems software and JCL. Experience in programming WANG 2200 series computers and in distributed processing, telecommunications interface to IBM Systems/370, OS environment would be an asset. Successful candidates must be flexible and willing to travel.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years commercial applications programming experience and a minimum of 1 years' exposure to application system design, preferably with Systems/370 in an OS environment, using COBOL language. BBA in Information Sciences or BS in Computer Science is desirable. Mark YI experience is preferred and a knowledge of accounting and financial applications is a definite asset.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years experience in the Timeshare/RJE/Telecommunications field with major effort directed towards support and development of timeshare systems. Timeshare experience desired in CMS or TSO. Solid technical ability in NCSS, Informatics or TYMSHARE systems acceptable with additional knowledge of other timeshare systems. Required languages include PLI, FORTRAN. Secondary knowledge in Assembler, BASIC, APL and COBOL is desired. BS/BA degree preferred. Strong technical work history will be evaluated as a substitute for technical degree.

Morrison-Knudsen offers competitive salaries, liberal fringe benefits and an excellent location. Interested applicants should request an application from:

Leslie Rasmussen, Personnel Department, Dept. 14.
MORRISON-KNUDSEN COMPANY, INC.
Box 7808
Boise, Idaho 83729
(800-635-5970 Toll Free)

M-K is an equal opportunity employer M/F

"SUNBELT CAREERS"

Group Leader Degree + 3 yrs IMS systems & mgmt exp	To $30,000
Project Leader Degree +5 yrs DS/MFG systems exp	To $28,000
Software 3 yrs DOS/VS/CICS software exp	To $24,000
Sr. Programmer Degree +4 yrs COBOL/CICS exp	To $20,000
Programmer/Analyst 2+ yrs, DL/1/DS or DDS exp	To $19,000
Programmer (Need 10) 1+ yr COBOL or RPG11 exp	To $15,000

Client co pays all employment expenses. Contact in conf, J. Schwab, (704) 527-4980.

FOX MORRIS
PERSONNEL
CONSULTANTS
4000 Park Road
Charlotte, NC 28209
EDP Professionals

EDP OPPORTUNITIES

Mark IV Cnslnt-development	$23K
IMS PL-1-degree	$21K
EDP Audit Mgr-Fort 100 co	$31K
Acctg Applicents Programmer-degr.	$21K
Anelysis/Programming-hvy user contact 370 DOS/OS Cobol	$20K
Econometric Modeling T/S bldg.	$25-30K
Biz Cnsltnt-Fort co 35% Int'l trvl	$25-32K
Proj Ldr Systems Progr-HASP CICS SVS	$25-28K
CICS DOS/VS COBOL-degree	$19-21K
UNIVAC 1140 Fortran/Assembler ALP	$19-23K
JR Software Merk IV	$15K
CICS VS 1-TSO VSAM-degr	$20-23K
BAL DOS A/R or G/L	$17-19K

Bill Borrelli
(212) 349-3610
William Harris Assoc
150 Broadway agency NY 10038

SYSTEMS SPECIALIST

skilled in computer programming and experienced in writing technical reports to work in federally-funded project in growing community college. Apply by Nov. 21, 1977 to: Personnel Office, Parkersburg Community College, Rt. 5, Box 167-A, Parkersburg, W.VA 26101.

An Equal Employment/Affirmative Action Employer in the Mid-Ohio Valley.

PROGRAMMER/ ANALYST:

Three positions available. Primary area of responsibility will be implementing administrative applications on DEC1080. COBOL required. DBMS-10 experience highly desirable. Salary based on experience. For additional information you may call David Senn, (502) 588-6616 collect. Send resume and salary history to: Ms. Betty W. Miles, Personnel Office, University of Louisville, Louisville, KY 40208

An Equal Opportunity Employer

PROGRAMMERS

If you are a programmer, programmer/analyst or systems analyst and would like the most individualized job search offered in the data processing field today, send your resume in confidence to:

DALLAS
SEARCH E.D.P., INC.
13773 N. CENTRAL EXPWY
SUITE 1305
DALLAS, TEXAS 75243

CINCINNATI
SEARCH E.D.P., INC.
SUITE 25,
3181 LINWOOD AVE.
CINCINNATI, OHIO 45208

HARTFORD
E.D.P. SEARCH, INC.
P.O. BOX 331
HARTFORD, CONN. 06101

SYSTEMS ANALYST COBOL PROGRAMMERS

Ethyl Corporation, a Fortune 500 company (194), has openings for a qualified systems analyst and for experienced Cobol programmers. All candidates must be degreed with an MBA preferable.

- Candidates for the analyst position must have a minimum of 3-6 years experience in the design (not programming) of EDP systems with concentration on manufacturing or accounting applications. The successful candidate will be involved in heavy systems design, interaction with users, economic evaluation of alternative proposals and development of programming specifications, all under limited supervision.
- Candidates for the programmer positions must have a minimum of 1-3 years experience as a COBOL programmer in a batch oriented business environment.

Ethyl Corporation is a major manufacturer of petroleum and industrial chemicals, plastics, and aluminum products with the centralized Corporate Data Center in Baton Rouge serving domestic and international sales and manufacturing facilities. The data center features a 370/155, 360/50 configuration operating under OS-MVT, HASP. Excellent salary and benefits program. Send resume, salary history and references to:

ETHYL CORPORATION
Mr. J.M. Klopf
451 Florida Blvd.
Baton Rouge, LA 70801

An Equal Opportunity Employer

ANALYST/ PROGRAMMER

Thilmany, a leader in the packaging, specialty papers field, has an immediate opportunity for an aggressive, results-oriented Analyst/Programmer to assume system design responsibilities in our Systems and Programming Group.

Our ideal candidate has a strong background in COBOL programming, 2 years on-line system design, with CICS & DL/1 a plus, and/or exposure to 3790. B.S. degree highly desirable.

We offer an opportunity for professional growth in a high quality of life area, plus competitive salary-fringe benfit package. Respond to: M.B. Maudsley

Thilmany

THILMANY PULP & PAPER CO
Division of Hammermill Paper Co
KAUKAUNA, WISCONSIN 54130

An Equal Opportunity Employer M/F

COMPUTER SCIENCE PROFESSIONALS
CAREER OPPORTUNITIES

Rexham Corporation, a Charlotte North Carolina based NYSE listed results-oriented manufacturing company with multiple divisions on-line is seeking professionals to work in our data processing department. A recently centralized data center with upgraded equipment and enlarged scope offers a major challenge in applications programming and in computer operations. On-line, realtime information systems will be developed for remote manufacturing facilities on a Univac 90/60 using VS/9.

SENIOR PROGRAMMER/ANALYST

A strong technical position offering opportunity to develop applications using ANS COBOL interactively. This individual will carry projects all the way from concept and user interface through design, coding, testing and implementation.

REQUIREMENTS:

- 5 years hands-on experience in business applications programming using ANS COBOL.
- Bachelors degree in Math or Engineering essential (Master's in Computer Science a plus).
- Heavy experience in design and analysis of major systems plus strength in JCL.
- Prior experience in development of financial systems a plus.

MANAGER-COMPUTER OPERATIONS

Positions offers an excellent opportunity to direct this production function with substantial user and management interface. Requires hands-on experience in operation of virtual memory systems serving multiple users concurrently.

REQUIREMENTS:

- 3 years solid, hands-on experience in computer operations on medium to large scale systems.
- Bachelors degree in Math, Engineering, Computer Science or Business Administration.
- Excellent working knowledge of virtual memory operating systems.
- Proven ability to supervise computer operators.

These career openings offer excellent compensation, with liberal benefits. Relocation will be paid to our pleasant Southeastern community, near a metropolitan region. For immediate consideration, please send resume with salary history, in confidence to:

Rexham CORPORATION
P.O. Box 4068, Charlotte, N.C. 28204
Attention: C. Payne
An Equal Opportunity Employer M/F.

Software Product Manager

Intel's newly established and rapidly growing Microcomputer Systems Division has been #1 in microcomputers from the beginning. Because of our explosive growth, we are in need of an aggressive, individual who wants to try new ideas to satisfy software requirements.

To qualify, you should have 2-4 years experience designing and marketing software for minicomputers or microcomputers plus familiarity with the needs and requirements of the OEM market. A BS EE, Computer Science or Math is required with an MBA preferred, plus knowledge of real time operating systems, languages and applications.

If you would like to work for the industry leader in OEM microcomputers, please send your resume to Jerry Hukee, Intel Corporation, 3065 Bowers Avenue, Santa Clara, CA 95051 or call collect at (408) 987-8748. We are an equal opportunity employer M/F.

intel

BUSINESS SYSTEMS ANALYSTS

Telemed Corporation, a leader in the fast growing automated health care industry, has immediate openings for talented, committed professionals to serve as analysts within the Information Systems group. These analysts must have a strong applications background and be able to take a project from start to finish; including definition, design, programming and implementation. Knowledge of COBOL is essential; background in data base systems and experience with the DEC System 10 would be an added plus.

Telemed provides a challenging and stimulating environment for professional growth, with the latest in computer technology and information systems. Business applications development is done on in-house DEC KL-10 Timesharing system, with your own CRT for on-line program development. These positions offer an opportunity to interface with top corporate management and propose solutions to real problems. Salary will be commensurate with your background, experience and potential contribution to the company.

Send your resume or a letter detailing your experience, in complete confidence, to:

Software & Professional Recruitment

TELEMED
CORPORATION

2345 PEMBROKE AVENUE
HOFFMAN ESTATES
ILLINOIS 60195

An equal opportunity employer

SOFTWARE MARKETING OPPORTUNITIES

Value Computing, Inc., a proven leader in the development and marketing of D.P. Operations Software Systems, is expanding its marketing force in the Chicago, New Jersey, and New York areas. Two positions are now available to the aggressive, self-motivated, experienced D.P. sales professional.

BRANCH MANAGER

(New York Metro Area)

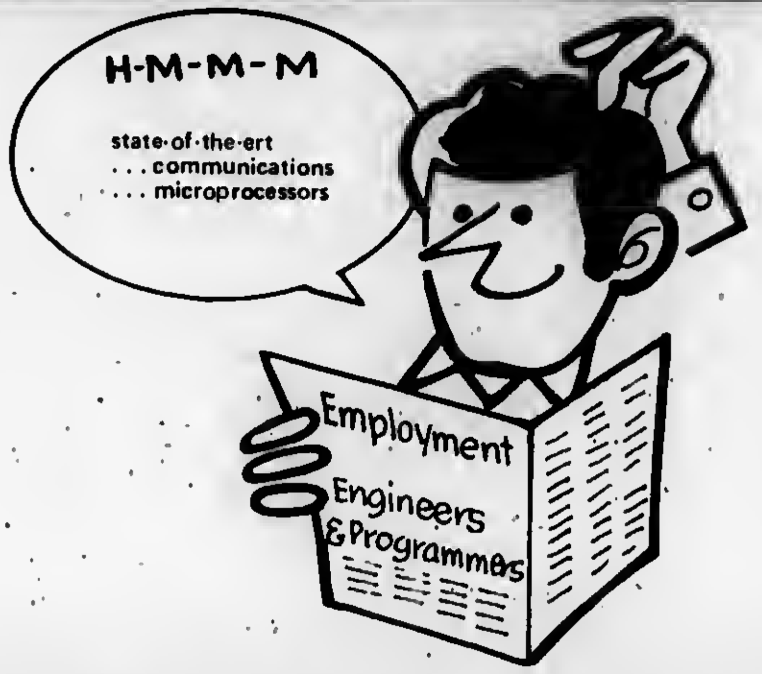
- Knowledge of D.P. Operations Desirable
- Comprehensive Software Product Line Offered
- Large Client Base and Extensive Prospect Lists

MARKETING REPRESENTATIVE

(Chicago and Cherry Hill, N.J.)

- Experience with DOS/VS Environments Highly Desirable
- Moderate Travel within Territory
- Products Include: Disk Space Management, File Independence, Partition Balancer, ISAM Support for 3350's and 3330 Mod II and Tape Library Systems

We are seeking ambitious individuals who will be well compensated for performance (Salary & Commission & Expenses & Bonus). Advancement potential in our dynamic company is excellent. Don't pass up this opportunity to maximize your income. Please immediately send your detailed resume in complete confidence to: Carl Dreyer, Value Computing, Inc., 300 West Marlton Pike, Cherry Hill, N.J. 08002, (609) 429-4200.



After reading all those employment ads why consider NCR's Communication Systems Division in Columbia, South Carolina?

We feel there are 2 compelling reasons:

1) TECHNOLOGY
2) LOCATION

In 1974, the Communication Systems Division was formed to provide the point of concentration for the design and development of products that assure compatibility of our terminals and computers in the communications environment. In addition, CSD also serves as NCR's center for microprocessor development and technology. We develop communications controllers, microprocessor modules, semiconductor memory modules, and their application to terminals and data processing systems.

CSD not only offers you a state-of-the-art technical environment, but also a lifestyle which will offer you the best of both worlds. Columbia, which is close to the seashore and mountains, enjoys the lifestyle of both city and country living with fine recreational facilities for tennis, golf, fishing, camping and water sports. The area also has excellent housing opportunities, low taxes, and is the home of the University of South Carolina.

So if you're seeking a technical challenge and a geographical change, your job search may be over. We currently seek qualified personnel in the following areas:

DESIGN ENGINEERS

- Processor design using MDS or bipolar bit slice devices
- Microprogramming
- Microcmputer diagnostic software
- State-of-the-art semiconductor memory design
- A/D to D/A conversion design
- Linear and digital circuit design
- Working knowledge of Intel 8080

COMPONENT ENGINEERS

- Experience in memories and microprocessors
- Knowledge of characterization and qualification requirements of LSI

MODEM ENGINEERS

- 1200 to 9600 BPS
- Design, application, evaluation and production support
- Microcomputer systems

PROGRAMMERS AND SYSTEMS ANALYSTS (Hardware/Software)

Openings exist in the following technical areas:

- Distributed network architecture
- Systems design
- Simulations
- Operating systems
- Real time systems
- Diagnostics and error recovery
- On-line communications drivers
- SDLC, asynch, bisynch disciplines
- Assembly language experience
- Assemblers, link editors and compiler development

A degree in engineering, math or computer science required. Recent graduates will also be given consideration. For immediate response, please send your resume with salary requirements in complete confidence to:

NCR

Mr. Ken Uhlig
Communication Systems Division
NCR Corporation
3325 Platt Springs Road
West Columbia, S.C. 29169

An Equal Opportunity Employer

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all-year, from tennis to whale-watching. NCR—for a good living *and* a good life.

Immediate openings in these areas

- **FIRMWARE**
- **DIAGNOSTIC PROGRAMMING**
- **PERFORMANCE MEASUREMENT**
  (GPS Simscript Modeling/Simulation)
- **SOFTWARE CONFIGURATION MANAGEMENT**
  (Design, develop programs to support software testing, release and repair.)
- **SOFTWARE DEVELOPMENT**
  (Design/implementation of multi-program O/S in a high-level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing.)
- **SOFTWARE QUALITY CONTROL**
- **MICR APPLICATION SOFTWARE**
  (Experience desired in both Transit and Proof of Deposit applications plus features such as CRT Reject-Reentry.)

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below.

NCR DATA PROCESSING DIVISION
16575 W. Bernardo Drive, San Diego, Calif. 92127
An Equal Opportunity Employer

S R A

EDP $16,000 - $40,000
PROG. - ANALYSTS - MGR. - SALES

Well-known client companies pay our fees. Applicants pay no fees or charges for any of the fine positions listed. Also good opportunities for degreed accounting and marketing professionals.

Mini-Programmer	$20-30K
Systems Programmer	$18-24K
Programmer/Analyst	$18-22K
Sr. Systems Analyst	$22-25K
Micro-Programmer	$1[illegible]-30K
Programmer	$16-18K
Software Designer	$20-35K
Sales Manager	$35-40K
MIS Director	$25-30K
Consultant (BSEE)	$20-28K

Mail Resume or Call Today

MICHIGAN
3001 South State St.
Suite 606
Ann Arbor, Michigan 48104
(313) 994-5632

OHIO
236 East Town St.
Columbus, Ohio 43215
(614) 228-1835

NEW YORK
M&T Bank Building
4455 Transit Rd.
Williamsville, N.Y. 14221
(716) 632-0400

OHIO
400 Ohio One Bldg.
25 E. Boardman St.
Youngstown, Ohio 44503
(216) 744-4361

SOUTH CAROLINA
Jefferson Square Bldg.
1801 Main St.
Columbia, South Carolina 29201
(803) 779-2080

Sanford Rose Associates

Systems & Procedures Analyst

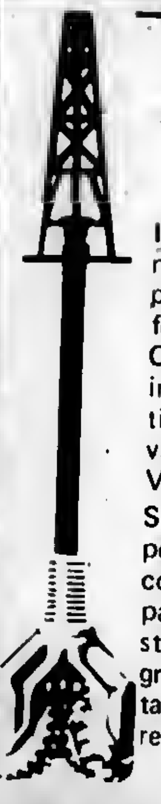
Our Corporate M.I.S. Department in downtown Pittsburgh is seeking an individual to formulate user guides and instruction manuals for computerized systems, establish guidelines for records retention and analyze office procedures and methods.

The successful candidate will have a bachelor's degree in Computer Science or related area, plus a minimum of 2 years experience in systems analysis and/or programming, preferably, in a manufacturing environment. Applicants should be user-oriented and have good technical writing skills.

Please submit resume including salary history to: Supervisor, Salaries Employee Relations.

JOY Manufacturing Company
1200 Oliver Building
Pittsburgh, PA 15222

An Equal Opportunity Employer M/F



PROGRAMMERS
SOUTHERN CALIFORNIA
Do you speak our language

If so, then program your future with Smith Tool. Our newly constructed facility in the Irvine Industrial Complex in Orange County offers unparalleled opportunity for talented Programmers with a minimum 2 years COBOL experience to become part of our growing installation. Initial assignments will involve new applications for our manufacturing systems. Our current environment consists of a 370/138 DOS/VS utilizing VM/CMS, with a planned conversion to a DL/1.

Smith Tool is a leading manufacturer of rock bits for the petroleum and mining industries. We not only provide competitive salaries and an excellent employee benefits package, but our progressive and innovative management style invites and encourages personal and professional growth. So, if we are speaking your language, bring your talents to Smith Tool, where you will be recognized and rewarded for your contributions.

Please apply to Brian Mathison at:

SMITH TOOL
Division of Smith International, Inc
17871 Von Karman Ave. Irvine, CA 92714

Equal Opportunity Employer M/F

PROGRAMMER ANALYST

The Glass Division has an immediate opening for a COBOL Programmer/Analyst with experience in TOTAL and ENVIRON 1 data base.

BS Degree in Computer Science, Mathematics or Business is desirable.

Competitive salary and fringe benefit program.

Candidates meeting these requirements should submit a detailed resume, including educational background, salary history, work experience and salary requirements to:

Ford
Glass Division
Attn: Mr. Roy D. Seifried
Salaried Personnel
P.O. Box 1698
Dearborn, Michigan 48121
An Equal Opportunity Employer

Career Positions Systems & Technical

Ten growth positions must be filled immediately. Openings include systems and marketing reps, senior and branch technical advisors, for a major national manufacturer of computer hardware.

Salaries range from $12,000 to $33,000. Requirements include experience and / or familiarity with company systems such as Burroughs, Honeywell, Control Data, or IBM.

Move up with a solid, expanding, and aggressive company. Client company will pay fee plus interviewing and moving costs. In professional confidence, mail your resume now, or call Jeff Holmes 417/883-1212.

dorsey love & associates inc
P.O. Box 4486, G.S.
Springfield, MO 65804

Systems Consultant

In-house EDP systems consultant opportunity with one of America's largest fraternal life and health insurance societies. Minimum of five years programming and systems analysis experience. Requires executive level communication skills. Central Wisconsin location in family-oriented community. Send resume to:

**Employment
Aid Association
for Lutherans
Appleton, WI 54919**

INSURANCE SYSTEMS

Education:
BS Math, Computer Science, Business

Software:
COBOL, ALC, IMS, DOS/OS, CICS, VS

Applications:
CPO, LIFE/70, LIFE-COMM, ALIS, PALIS, Pensions Financial

Environment:
Life, Casualty, Variable Life

Experience:
2 or more yrs. programming, design, consulting, installation, development, project management, systems programming.

Location Desired
New England, Middle Atlantic, Midwest, Southeast, Southwest

Salary Range:
$16,000-$30,000

If your resume could be prepared from the above, call or write Jack Edwards to explore your options. Jack's ONLY speciality is insurance data processing. He is a FLMI and has been in the business for 19 yrs.

*Jack Edwards Associates
Suite 600
8150 Leesburg Pike
Vienna, Virginia 22180
(703) 821-0688
Insurance Personnel*

Operating Systems Programmer

We have an immediate opening for an Operating Systems Programmer who is experienced in file subsystem and implementation of a general input/output manager. This individual will be responsible for the design, implementation and documentation of the standard input/output manager on the STAR 100 computer. BS/MS in Computer Science or a related discipline and a minimum of 2 years assembly language experience on large scale systems are required. For immediate consideration, send resume to K. Hardy, Dept. 40-A, 215 Moffet Park Drive, Sunnyvale, CA 94806.

CONTROL DATA CORPORATION
An Affirmative Action Employer M/F

SYSTEMS ANALYSTS

The Computing Services Center of Wayne State University has acquired an Amdahl 470/V6 and is presently upgrading it to take advantage of this advanced architecture. You will have the opportunity to work on IBM's VM and MVS and one of the industry's most advanced data base management systems, presently under test. This is a unique opportunity to grow in a sophisticated on-line environment.

Bachelors degree in Computer Science, applied science or related area required. Systems analysis and programming experience desirable. Salary range $15,298 - 19,822.

Send resume and supporting credentials to

Mergaret B. Centy
Computing Services Center
5950 Cass Avenue
Wayne State University
Detroit, MI 48202

or call (313) 577-1853 for more information.

**WAYNE STATE UNIVERSITY
COMPUTING SERVICE CENTER**
an affirmative action equal opportunity employer

ROBERT HALF PERSONNEL AGENCIES

of ORANGE

PROGRAMMER ANALYST

An immediate opening exists for a Programmer Analyst. Our client, a major division of a Fortune 200 company in an excellent So. California location requires a minimum of 4 years 370 COBOL. Business applications and knowledge of production payroll also desired. Salary to $20K with excellent fringe benefits. Contact Joe Manella.

**500 S. Main
Orange, CA.
(714) 835-4103**

of HARTFORD

PERFORMANCE ANALYST

New England client expanding IBM/MVS Data Center. Indiv. with hardware/software preferred monitoring background qualifies for excellent long term growth opportunity. Salary is open O.O.E.

**Contact Stan Durbas
for details at:
111 Pearl St.
Hartford, Conn. 01603
(203) 278-7170**

of Kansas City

Programmer/Analyst	$14-$17K
Project Leader	$18-$22K

Multiple openings exist with K.C. State of the Art Installation. All fees and expenses paid.

**127 W. 10th
Kansas City, MO 64105
(816) 474-4583
Contact: Georga Wetermen**

of ST. LOUIS

COUNTRY LIVING

Firm in mid-state Missouri population 15,000 is looking for a good exp. COBOL Programmer/Analyst with retail bkgd. that wants to live in a small town. Company has 360/50 DOS, going to 370 in the future. Any knowledge of RPGII a plus, also a degree a plus. Salary to $18,000.

**7733 Forsythe Blvd.
St. Louis, MO 63105
(314) 727-1535**

of BOSTON

**PROJECT LEADER/
SYSTEMS ANALYST**

Creativ Indiv. w/min. 3 yr exp. in systems analysis, client interface, COBOL prog. 80% analysis; 20% prog. Profit Sharing & Bonus. Excellent state of the art shop in Boston. To $20,000.

SYSTEMS PROGRAMMER

Excellent growth potential with prominent Boston financial services org. Requires expertise in both Sys. Gen & OS/MVS for IBM 370/168. Multi machine environment, w/progressive state of the art mgmt. Contact: Jim Staunton.

**140 Federal St.
Boston, MA 02110
(617) 423-6440**

of LOS ANGELES

**SR. PROGRAMMER
ANALYST**

A major entertainment industry is seeking a Senior Programmer Analyst with 2+ years 370 COBOL and bal exp. either DOS or OS JCL needed. Some PL1 would be a plus. They will train in CICS and DATABASE. System background should include financial and distribution. Salary to $18K with super fringe benefits. Contact Duncan Whita.

**3600 Wilshire Blvd.
Suite 1814
Los Angeles, CA 90010
(213) 386-6805**

of NEW YORK

**DATA BASE
ADMINISTRATOR**

Ground floor opportunity to join a fiscal control group of a major New York City financial service organization. IBM 370/158 VS/1 using IMS COBOL. Full responsibility for applications and staffing. Challenging. $27,000. Contact: Petar Smith.

**(212) 221-6500
522 Fifth Avenue
New York, N.Y. 10036**

of HOUSTON

PROG ANALYST-Over 60 AVAIL-IMS a +	18-24K
PDP PROG ANAL-ALC MACRO-DB	18-20K
PROG ANALYST-MSA Payroll	18K+
OPS ANALYST-Hardware/soft. monitors	18-24K
SYS PROG-Internals + Sys-Gens, ALC	17-19K
SYS ANAL-A/R, A/P G/L, etc	20-22K
PROJ LDER-Refinary MOD, Oil/Gas plan	22-25K
PROJ LDER-Fin Sys/COBOL/ALC/TOTAL	18-22K
MGR S/P-BBA + Fin Sys TOTAL DB	20-23K

Jim Fleming 713-961-3271 4801 Woodway, Suite 231W Houston, Texas 77056

of BUFFALO

SR. SYSTEMS ANALYST

High visibility position in New York City requires seasoned analyst to travel 15% throughout U.S. to RJE sites. Major responsibility will be to head up team in design and implementation of distribution, marketing and financial applications. Aggressive peer group. 370/138 VM shop. MBA $24,000.

**(716) 842-0801
1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202**

of SEATTLE NorthWest

RPG II PROGRAMMER

For software house installing general business systems in IBM Systems 3 environment. Heavy client interface/marketing support.

SYSTEMS ANALYST

To implement gen'l. business in on-line IBM DOS/VS RJE environment.

**John Warner
(206) 624-9000**

of DALLAS

The demand for EDP professionals continues extremely high in the Dallas area. We have immediate openings at all levels . . . salary ranges. All fees, interview, and relocation expenses are completely paid for by our client companies. Please rush your letter or resume on a strictly confidential basis to:

**Ron Urbech
Two Northpark East
Suite 750
Dallas, TX 75231
(214) 363-3300**

of MILWAUKEE

PROGRAMMER/ANALYST

Fine, rapidly-growing manufacturer is looking for a "doer"; experience including COBOL or PL/1, understanding of on-line systems. To $20,000.

**777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-8380**

of FLORIDA

P/A Bnking CPCS	16K
P/A Mfg DOS/VS CICS	15K
Anal Constr Univ DMS	22K
P/A TOTAL cobol	16K
Prog Bnking Neat 3	14K
Prog real time PDP	22K
P/A Life Ins cobol	17K
Sys Prog CICS IMS	16K
Prog real time sci	22K
Anal IDMS cobol mfg	18K
Prog IMS cobol	19K
P/A 370/OS cobol	16K
Sys Prog IMS DOS/OS	18K
Mgr Mini cbl/basic	24K
Consult Bnkg degree	19K
Prog Banking Burr	14K
P/A Burr DMS II	18K
Anal Data com spec	17K

**1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4181**

of IOWA

PROGRAMMER ANALYSTS

Want to learn OS? Client Company converting in mid 1978. Excellent facilities. Will train in on-line and Data Base systems. 2-8 years exp. Salaries 14-18,000. Fee Paid.

**Call Ken Alfan at
(515) 244-4414
317 6th Avenue
Des Moines, Iowa 50309**

of PORTLAND No. West

PROGRAMMER

FORTRAN/COBOL exper. Excellent opportunity in large IBM 370/OS/VS sophisticated state-of-the-art shop.

PROGRAMMER/ANALYST

Will implement financial systems in local IBM shop. Prefer COBOL and BAL. Excellent fringes.

**Nancy Ankcorn
(503) 222-9778**

of PHOENIX

Prestigious client now has several senior analyst positions within their Corp. Support Group. Considering a wide variety of applications exp. involving Analysis of IBM Data Bases. A good working knowledge of PL1, large IBM 370 operating systems, and JCL are required within this large and sophisticated environment. Co. will pay fee, interview and relocation expenses. For confidential consideration, call or mail your resume to:

**Bob Fox
3225 N. Central Ave.
Suite 812
Phoenix, AZ 85012
(602) 264-6488**

of MICHIGAN

**SOUTHFIELD &
GRAND RAPIDS
SYSTEMS SPECIALIST**

"Blue Chip" firm is aggressively seeking individual with solid success history in systems evaluation, design, and implementation. This is a unique opportunity to become involved in advanced "state of the art" TP DATA BASE. Hi-visibility spot, will interface with senior mgmt. group. Superior fringe package. Start 20-30K plus reloc. Fee Paid.

**670 Honeywell Ctr.
Southfield, MI 48075
456 Frye Bldg.
Grand Rapids, MI 48503**

of WASH. /BALTIMORE

DATA BASE ADMIN-Heavy Burroughs exp. DBMS or IDS	$29K
DESIGN ANALYST-State of the arts OS & software devel. Data base and TP must, big Honeywell exp. a plus.	$24K
PROG/ANAL-COBOL, big IBM musts. IMS, DL1, CICS on 370/158, OS a plus	$20K
SYS ANALYST-To interface with energy oriented users. COBOL, ALC on 370/168	$23.5

**7316 Wisc. Ave.
Washington, D.C. 20014
(301) 652-1860
217 Quad.
Baltimore, MD 21210
(301) 323-7770**

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SYSTEMS ANALYST

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Plans, organizes, and controls Computer Operations Section in operation of Computer and Peripheral Data Processing equipment. Has full charge of all activities of Equipment Operations. Established schedules for maximum utilization of equipment. Assigns personnel to operations. Instructs and trains personnel where nacessary. Coordinates activities with other Data Processing sections. Two years experience in supervisory position desirable. Contact Vance B. Nelson, Computer Services, Michigan Technological University, Houghton, MI 49931. An equal opportunity educational institution/equal opportunity employer.

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Washington, D.C. 20001

PROGRAMMER ANALYSTS

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Federated Department Stores, a national leader in retailing, has a major systems development program in progress that is committed to developing advanced retailing systems incorporating data base and distributive processing capabilities.

Advanced technologies include:

IMS/VS MVS NCP SNA
VTAM VSAM TSO Data Dictionary

Methods Include: Top-down design, HIPO, structured walk-through, simulation.

There are still some ground floor opportunities at the forefront of design and development for PROGRAMMER ANALYSTS who have above-average credentials and wouid like to embark their careers in our long-term retail systems research and development program.

If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to:

Mr. Frank McKain

Federated Department Stores, Inc.
Systems Research & Development, Room CW-1114
222 W. 7th St., Cincinnati, Ohio 45202
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PROGRAMMER ANALYST

Are you tired of feeling like you're not getting ahead in your current position? Why not take a step forward to an exciting new phase of your career in data processing. Due to an increase in staff requirements, Computer Dynamics, Inc., has IMMEDIATE openings for trained data processing professionals. If you have a minimum of 3 years COBOL, FORTRAN, ASSEMBLER or IMS experience on IBM, Burroughs, Honeywell or mini-computers we would like to talk with you NOW.

CDI, a successful firm supplying data processing services to a wide variety of client companies is offering you, JOB STABILITY coupled with a diverse array of interesting assignments, all in a current state-of-the-art environment, plus a competitive salary, bonus program, profit sharing and comprehensive benefits including dental.

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Computer Dynamics, Inc.

PROGRAMMERS

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Continued growth and expansion in Hennepin County's Data Processing Department has brought all these factors together. We're offering these winning positions to experienced COBOL programmers. Advantages include challenging responsibilities in a large scale IBM shop combined with excellent opportunities for advancement. The County also offers a liberal salary and benefit package.

We are currently involved in developing applications in a variety of areas. If you desire a change from your normal routine and are anxious to assume greater responsibility, this is the ideal work environment for you. Send your resume in complete confidence to:

Dave Sier
Hennepin County
Personnel Department
A-3 Government Center
Minneapolis, Minnesota 55487

Hewlett-Packard 3000
Senior Analyst/Programmer Analyst

This major chemical manufacturing corporation is seeking two professionals to develop and install systems in an on-line multi-terminal minicomputer environment at our plant near Baton Rouge, Louisiana. Hardware will be HP 3000 Series II using COBOL, SPL, and Image Data Base.

The Senior Analyst will operate as the project leader of a small team and assume total responsibility for the installation, start-up, and continuing support of a large HP 3000 minicomputer system. Initial development effort will be in Inventory and Purchasing areas.

Requirements include a related degree and 2-3 years minicomputer experience, HP 3000 preferred.

Salary will be commensurate with qualifications. For confidential consideration forward resume including salary history to:

Department AJC

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P.O. Box 181
100 Cherry Hill Road
Parsippany, New Jersey 07054

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BASF

Director of Academic Computing Services

Applications are sought for Director of Academic Computing Services. George Mason University, the State University in Northern Virginia, with 9500 students is located in Metropolitan Washington, D.C. It offers 39 Baccalaureate and 17 Masters programs.

This is an opportunity to participate in the development of a university computing center. Minimum qualifications include MS in Computer Science or related field, 2 years experience in Computing Center operations, programming experience in high level languages, and an ability to work with a wide variety of computer users.

It is desired that the successful candidate have some knowledge of systems programming, experience in an academic computing environment and some evidence of administrative ability. Salary is commensurate with qualifications and experience. The position is available 1 February 1978. Send resumes and names of three references by 1 December 1977 to Professor Stephen B. Seidman, Graduate School Office, George Mason University, 4400 University Drive, Fairfax, VA. 22030. An EEO/AA employer.

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31350 Smith Road
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GRAPHICS PROJECT MANAGER

Control Data Corporation Application Services Division has an immediate opening for an experienced Project Manager in its suburban Twin Cities plant.

This lead position is in development of new Interactive Graphics Systems with emphasis on software for distributed processing. Candidates are required to have a minimum of 4 years experience in graphics software and/or distributed processing. An advanced degree in Engineering or Computer Science is desirable.

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We are a rapidly growing data processing service organization located in Cincinnati, serving the financial community. We offer challenging opportunities in research and development for highly motivated data processing professionals.

We are seeking individuals that have a minimum of 2 years Assembler language experience with knowledge of OS or OS/VS data management and supervisor services. Knowledge of VSAM, VTAM or TSO is a definite plus.

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COBOL or Assamblar programming axpariance assential, communications with bi-sync and on-lina background helpful. Ideel candidate will have the above experiance, a BS degree, and a beckground in either Micro-Mini systams or programmabla terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

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SYCOR

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Optimum Systems Inc., one of the nation's leading computer utility organizations, is currently expanding our SUPERWYLBUR* development group in Santa Clara, California. We have immediate career positions for Senior System Programmers.

You should have a degree or equivalent and 4 to 8 years experience working with large scale IBM 360/370 operating system internals. (MVT, VS1, SVS or MVS). Strong background in assembler language, and a working knowledge of interactive terminal systems, preferably WYLBUR is desirable. Experience with HASP3, HASP4 or JES2 is also desirable. Must possass good communicative skills, Some supervisory skills a plus.

You will be involved with the development, enhancement and maintenance of SUPERWYLBUR, the newest generation terminal system with complete support for text management, job submission and retrieval and word processing. Candidates must be self motivated with solid record of accomplishments.

Ideally located in the San Francisco Bay area, OSI offers an excellent benefits and salary package coupled with an aggressive, dynamic environment in which to work and grow. To further pursue these outstanding career opportunities with our growing corporation, send your detailed resume and salary requirements to:

SUPERWYLBUR Dept.
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2801 Northwestern Parkway
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SYDNEY UNIVERSITY
AUSTRALIA
LECTURESHIP IN COMPUTER SCIENCE

Applicants should have higher degree or equivalent qualification in Computer Science; background and interest in digital or software engineering is particularly desirable.

The Department is equipped with several mini-computers and has on-line access to the University's Cyber 72 computer. It offers courses in Computer Science from first-year to honours level, followed by M.Sc. and Ph.D. programme. Appointee expected to teach and carry out own research.

Information available from Registrar, University of Sydney, NSW 2006, Australia with whom applications close on 30 November 1977.

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MANAGER OF MARKETING/ SMALL COMPUTER SYSTEMS

A major and internationally known computer manufacturer is currently seeking a Marketing Manager for its Corporate Headquarters staff.

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Interested applicants please send resume, including salary history, in confidence to J.W. Haynesworth and Associates, CW Box 3335, 797 Washington St., Newton, MA. 02160.

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If you are interested, we'd like to learn more about you and tell you more about AMS. Please send us your resume with salary history; if we believe you're qualified, we'll send you a copy of AMS In Perspective and schedule an interview at our headquarters office which is located in the Washington, D.C. metropolitan area.

Frank A. Nicolai
Executive Vice President

AMERICAN MANAGEMENT SYSTEMS, INC.

Department M
1515 Wilson Blvd.
Arlington, Virginia 22209

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Dir. of Professional Personnel
College of DuPaga
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AUSTRALIA

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Applicants should have higher degree or equivalent qualification in Computer Science; background and interest in digital or software engineering is particularly desirable.

The Department is equipped with several mini-computers and has on-line access to the University's Cyber 72 computer. It offers courses in Computer Science from first-year to honours level, followed by M.Sc. and Ph.D. programme. Appointee expected to teach and carry out own research.

Information available from Registrar, University of Sydney, NSW 2006, Australia with whom applications close on 30 November 1977.

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Excellent salaries commensurate with experience. Fine benefits package.

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You can expect strong management support and independence to insure your success in reaching our employee development goals.

If you are ready to assume this level of accountability and creative opportunity, we invite your resume.

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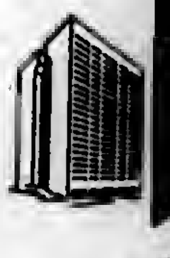

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Professional Employment,
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MIS CAREERS

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Mr. G.T. Mills
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Fiberglas Tower
Toledo, Ohio 43659

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PROGRAMMER-ANALYSTS
Southeastern Location

We have an immediate need for Programmers & Analysts to participate in a major state of the art development effort. IBM 370 OS, COBOL and/or BAL required; experience with CICS or Intercomm communications monitors and IMS or TOTAL Data bases helpful.

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SYCOR

MANAGER USER LANGUAGES SOFTWARE DEVELOPMENT

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We offer a competitive range of salaries, comprehensive benefits and highly visible opportunities for future growth. To arrange an interview, send your resume to:

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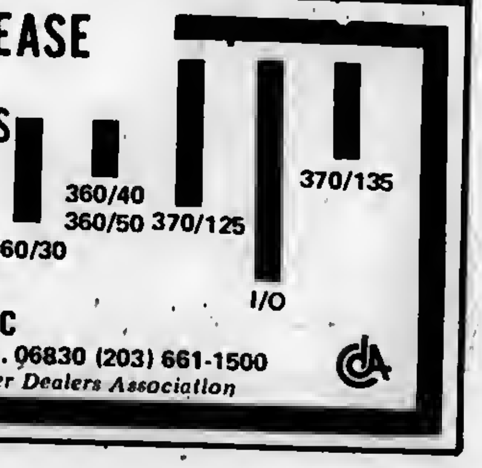

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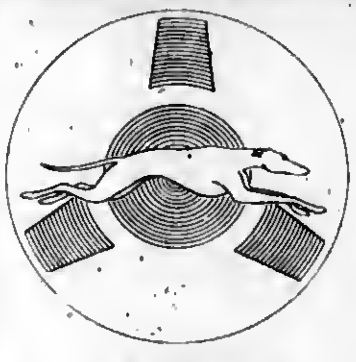

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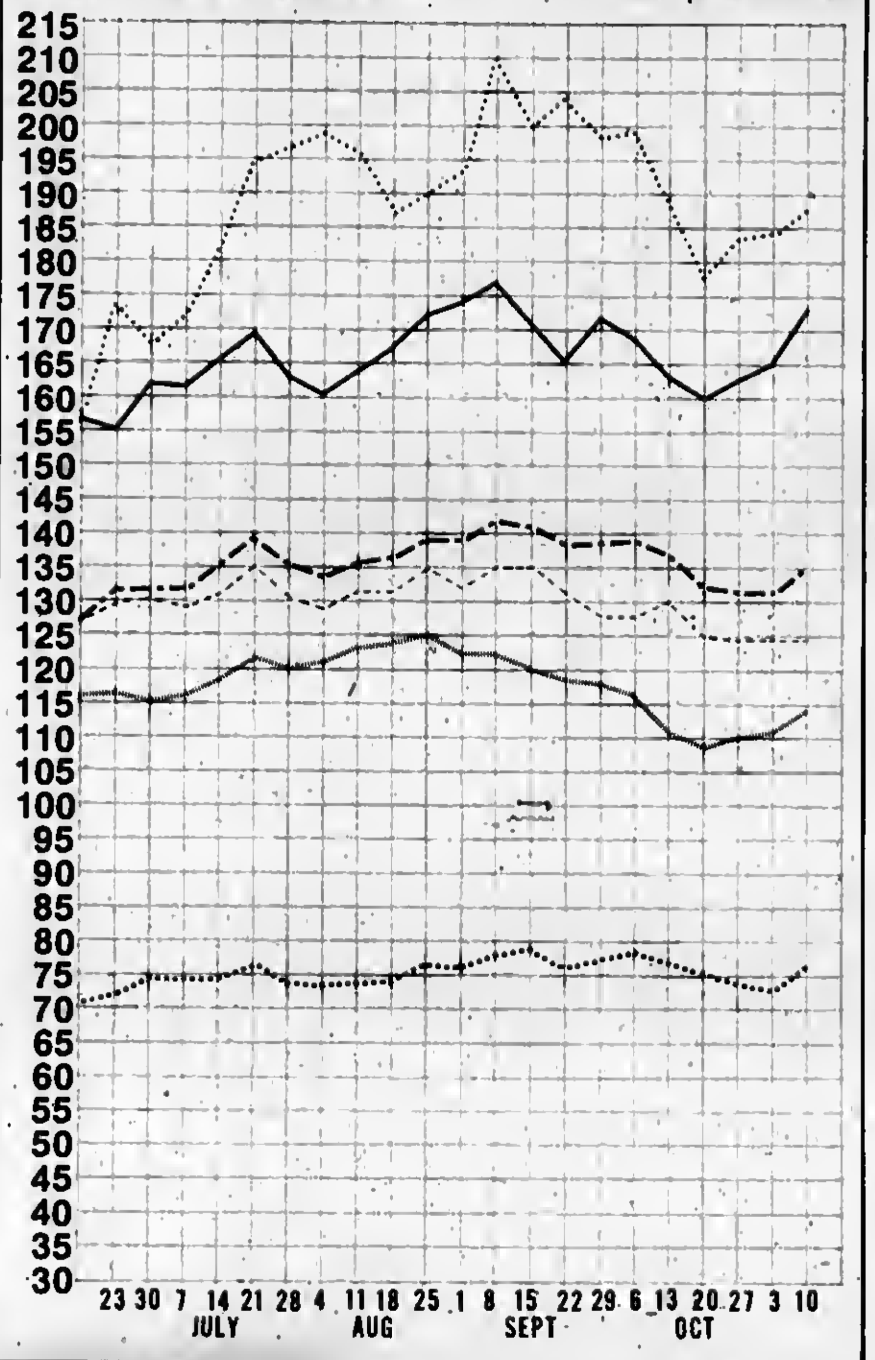

Earnings Reports

EM&M
Three Months Ended Oct. 1

	1977	1976
Shr Ernd	$.19	$.25
Revenue	27,379,000	22,164,000
Tex Cred	.....	580,000
Eernings	1,303,000	1,633,000
9 Mo Shr	.46	1.17
Revenue	80,660,000	65,396,000
Tex Cred	....	560,000
Eernings	3,396,000	7,114,000

EAIRCHILD CAMERA AND INSTRUMENT
Three Months Ended July 3

	1977	1976
Shr Ernd	$.29	$.52
Revenue	117,744,00	113,267,000
Eernings	1,571,000	2,656,000
6 Mo Shr	.70	.56
Revenue	230,569,000	206,377,000
Eernings	3,600,000	3,055,000

GENERAL AUTOMATION
Yeer Ended July 30

	1977	1976
Shr Ernd	$.75	.....
Revenue	84,476,000	$70,737,000
Tex Cred	420,000	.....
Eernings	1,674,000	(789,000)
3 Mo Shr	.16	.19
Revenue	22,932,000	22,933,000
Tex Cred	312,000	.....
Eernings	406,000	463,000

HEWLETT-PACKARD
Three Months Ended July 31

	1977	1976
Shr Ernd	$1.07	$.65
Revenue	341,051,000	277,477,000
Eernings	30,527,000	18,472,000
9 Mo Shr	3.13	2.05
Revenue	960,931,000	792,680,000
Eernings	98,669,000	57,319,000

INEOREX
Three Months Ended July 1

	1977	1976
Shr Ernd	$.17	$.17
Revenue	15,624,000	15,476,000
Tax Cred	77,000	132,000
Eernings	512,000	499,000
6 Mo Shr	.32	.29
Revenue	30,030,000	30,363,000
Tex Cred	156,000	201,000
Eernings	940,000	852,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 9, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUIER SYSTEMS

EXCH		PRICE 1977 RANGE 111	CLOSE NOV. 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMOAHL CORP	22- 44	42 1/4	+4 1/4	+11.1
N	BURROUGHS CORP	55- 91	65 3/8	+1 1/2	+2.3
O	COMPUTER AUTOMATION	18- 30	24 5/8	- 1/8	-0.5
N	CONTROL OATA CORP	20- 26	21	+1	+5.0
O	CRAY RESEARCH INC	15- 29	24 1/2	+3 1/4	+15.2
N	OATA GENERAL CORP	35- 51	48	+3 3/6	+7.5
N	OATAPOINT CORP	18- 34	34 1/4	+2 5/8	+8.3
N	OIGITAL EOUIRMENT	37- 53	45 1/4	+1 3/4	+4.0
N	ELECTRONIC ASSOC.	2- 3	2 1/8	+ 1/8	+6.2
A	ELECTRONIC ENGINEER.	8- 11	9 5/6	- 1/4	-2.5
O	FOUR-PHASE SYSTEMS	13- 19	18 3/8	+1 1/4	+7.2
N	FOKBORO	41- 54	42 1/8	- 3/8	-0.8
O	GENERAL AUTOMATION	6- 9	6 1/4	+ 1/2	+8.6
O	GRI COMPUTEP CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARO CO	69- 87	72 1/4	+1 7/8	+2.6
N	HONEYWELL INC	43- 55	45 3/4	+2 3/8	+5.4
N	19M	245-286	252 3/4	+3 1/8	+1.2
O	MANAGEMENT ASSIST	5- 9	8 5/8	+ 5/8	+7.8
O	MICROOATA CORP	7- 18	11 1/8	- 1/8	-1.1
O	MODULAR COMPUTER SYS	5- 8	7 5/8	+ 3/R	+5.1
N	NCR	32- 47	41 3/8	+1 3/8	+3.4
O	PRIME CONPUTER INC	12- 23	19 5/8	+ 1/2	+2.6
N	PERKIN-ELMER	17- 22	19 1/4	+1 3/8	+7.6
N	RAYTHEON CO	16- 33	30 3/8	+1 1/2	+5.1
N	SPERRY RANO	30- 42	33 5/R	+2 1/4	+7.1
O	SYCOR INC	8- 15	14 3/4	+ 3/4	+5.3
A	SYSTEMS ENG. LARS	5- 8	7	+ 3/8	+5.6
A	WANG LABS.	10- 14	11 1/8	+ 3/4	+7.2

LEASING COMPANIES

EXCH		PRICE 1977 RANGE 111	CLOSE NOV. 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 3/8	- 1/8	-2.7
O	BOOTHE-COURIER CORP	8- 10	10 5/8	- 1/8	-1.1
O	COMOISCO INC	10- 13	10 7/8	+ 1/8	+1.1
A	COMMERCE GROUP CORP	1- 3	3/4	- 1/8	-14.2
A	COMPUTEN INVSTRS GRP	1- 2	1	0	0.0
N	OATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	OCL INC	1- 2	2 1/8	+ 1/8	+6.2
N	OPF INC	6- 9	8 1/8	+ 1/8	+1.5
N	ITEL	13- 22	18 3/8	+1	+5.7
N	LEASCO CORP	19- 27	25 1/8	+2 1/4	+9.8
O	LEASPAC COPR	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEK CORP	5- 11	5 3/4	+ 3/8	+6.9
N	U.S. LEASING	10- 15	13 7/6	+1 1/4	+9.9

EXCH: N=NEW YORK; A=AMERICAN; R=PHIL-BALT-WASH
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER
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SOFTWARE & EOP SERVICES

EXCH		PRICE 1977 RANGE 111	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK RCT CHNGE
O	AOVANCEO COMP TECH	0- 2	1/2	0	0.0
O	ANACOMP INC	7- 10	8 3/4	0	0.0
A	APPLIEO OATA RES.	5- 10	7 1/4	0	0.0
N	AUTOMATIC OATA PPOC	23- 30	26 8/8	+ 5/8	+2.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	CONPU-SERV NETWORK	9- 15	10 3/4	+1	+10.2
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTEN HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/8	+ 3/4	+8.0
N	COMPUTER SCIENCES	7- 9	8 1/8	+ 1/2	+6.5
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	0	0.0
O	COMSMARE	5- 8	7	+ 1/4	+3.7
O	DATA OIMENSIONS INC	3- 5	3 7/8	- 1/2	-11.4
O	OATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC OATA SYS.	14- 20	15 5/8	+1 3/8	+9.6
O	INSYTE CORP	2- 3	1 1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/R	0	0.0
O	KEYOATA CORP	1- 3	1 3/8	- 1/8	-8.3
A	LOGICON	7- 17	11 5/8	- 1/8	-1.0
A	NANAGEMENT OATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	13- 27	14 1/2	-11 1/8	-43.4
O	NATIONAL OATA CORP	4- 7	6 1/8	+ 1/4	+4.2
A	ON LINE SYSTEMS INC	16- 22	17	0	0.0
N	PLANNING RESEARCH	3- 6	4	+ 1/8	+3.2
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIOATA INC	2- 3	2 1/2	+ 1/6	+5.2
O	REYNOLOS & REYNOLO	17- 20	18	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 4	3 1/2	0	0.0
O	TYMSHARE INC	14- 23	19 5/8	+1 1/8	+6.0
A	URS SYSTENS	4- 5	4 3/4	+ 1/8	+2.7
N	WYLY CORP	1- 2	3/4	0	0.0

RERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE 111	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK RCT CHNGE
N	AOORESSOGRAPH-MULT	10- 15	13 1/4	+ 3/8	+2.9
O	AOVANCEO NEMORY SYS	7- 9	6 3/4	- 1/4	-3.5
N	AMPEX CORP	8- 11	9 1/8	+ 3/8	+4.2
O	ANOERSON JACOBSON	3- 5	4 1/4	+ 1/2	+13.3
N	APPLIEO OIG OATA SYS	10- 20	13 1/2	+ 3/8	+2.8
O	BEEHIVE INT'L	5- 12	5 1/9	- 3/4	-12.7
A	BOLT, BERANEK & NEW	7- 9	7 1/4	+ 1/2	+7.4
N	BUNKER-RAMO	8- 12	10 1/4	+ 1/4	+2.5
A	CALCOMP	3- 5	2 3/4	+ 1/R	+4.7
O	CAMBRIOGE NEMORIES	1- 4	3	-	-2.0
N	CENTNONICS DATA COMP	20- 30	20 1/4	+ 3/8	+1.8
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER CONNUN.	5- 8	6 1/4	+ 1/4	+4.1
O	COMPUTER CONSOLES	4- 7	4	+ 1/4	+6.6
A	COMPUTER EOUIPMENT	2- 3	3	+ 1/4	+9.0
O	COMPUTEN TRANSCEIVER	1- L	1 1/8	- 1/8	-10.0
O	COMTEN	9- 13	9 3/4	+ 1/4	+2.6
N	CONRAC CORP	19- 28	20 5/8	+1	+5.0

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	OATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	OATA 100	6- 9	8 5/8	+1 1/4	+16.9
A	OATA PRODUCTS CORP	9- 17	16 1/2	+ 7/8	+5.5
O	OATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	OATUM INC	1- 2	1 5/8	- 1/8	-7.1
O	OECISION OATA COMPUT	2- 3	1 7/8	0	0.0
O	OELTA OATA SYSTEMS	1- 1	3/9	0	0.0
A	DOCUMATION INC	6- 9	9 1/4	+1 5/8	+21.3
O	DATARAM CORP	2- 12	11 1/2	+2	+21.0
N	ELECTRONIC M & M	4- 5	3 1/2	0	0.0
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 12	9 5/8	+1 3/8	+16.6
N	HARRIS CORP	28- 42	41 7/8	+4 1/8	+10.9
A	INCOTERN CORP	10- 18	17 1/2	+ 3/4	+4.4
O	INEOREX INC	4- 7	5 1/8	+ 1/4	+5.1
O	INFORMATION INTL INC	9- 14	9 1/4	- 1/4	-2.6
O	INTEL CORP	38- 57	45	+3	+7.1
A	LUNOY ELECTRONICS	3- 6	4 1/8	- 1/4	-5.7
O	MSI OATA CORP	6- 13	12 1/4	+ 7/8	+7.6
O	MEMOREK	23- 34	26 1/7	+1 5/8	+6.5
N	NOHAWK OATA SCI	5- 8	6	+1	+20.0
O	RENRIL CORP	2- 5	4 7/8	+ 1/8	+2.6
N	PERTEC CORP	7- 10	9 3/4	+ 7/8	+9.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	OUANTON CORP	3- 5	3 1/4	- 1/4	-7.1
O	RECOGNITION EOUIP	6- 10	7 3/R	+ 1/2	+7.2
O	SCAN OATA	1- 2	7/8	+	+7.1
O	STORAGE TECHNOLOGY	10- 18	18 1/8	+1 7/8	+11.5
O	T BAN INC	7- 13	12	+ 5/8	+5.4
O	TALLY CORP.	4- 6	3 1/2	0	0.0
A	TEC INC	7- 10	6 7/8	- 1/4	-3.5
N	TEKTRONIX INC	29- 38	37 1/8	+ 1/4	+0.6
N	TELEX	2- 3	2 5/R	+ 3/8	+16.6
O	WILTEX INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PROOS	6- 8	6 3/8	+ 5/8	+10.8
O	BALTIMORE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	13 3/8	+ 7/8	+7.0
O	CYBERMATICS INC	1- 1	1	0	0.0
O	OUPLEX PROOUCTS INC	14- 19	16 3/4	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 3/4	- 1/8	-2.1
O	GRAHAM MAGNETICS	11- 17	17 1/4	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	14	-1	-6.6
N	3M COMPANY	46- 56	48 3/8	+2 1/8	+4.5
O	MOORE CORP LTO	24- 37	25 1/2	+1 3/4	+7.3
N	NASHUA CORP	16- 28	20 1/6	+ 3/4	+3.8
O	STANOARO REGISTER	18- 25	21 1/2	+ 1/7	+2.3
O	TAB PROOUCTS CO	10- 19	9 1/2	0	0.0
N	UARCO	18- 22	19 1/4	+1 1/4	+6.9
A	WABASH MAGNETICS	10- 15	13	+1 1/8	+9.4
N	WALLACE BUS FORMS	17- 21	18 1/2	- 1/8	-0.6

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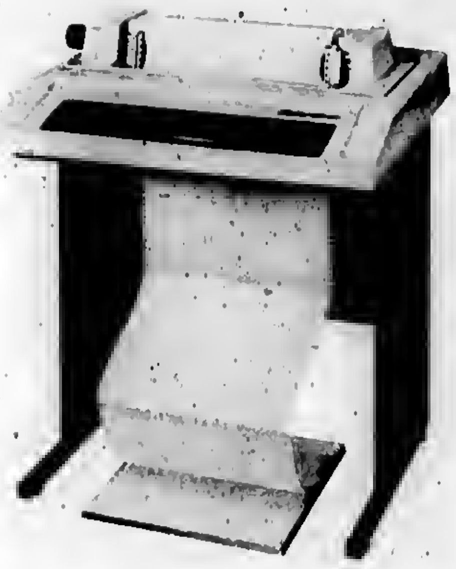

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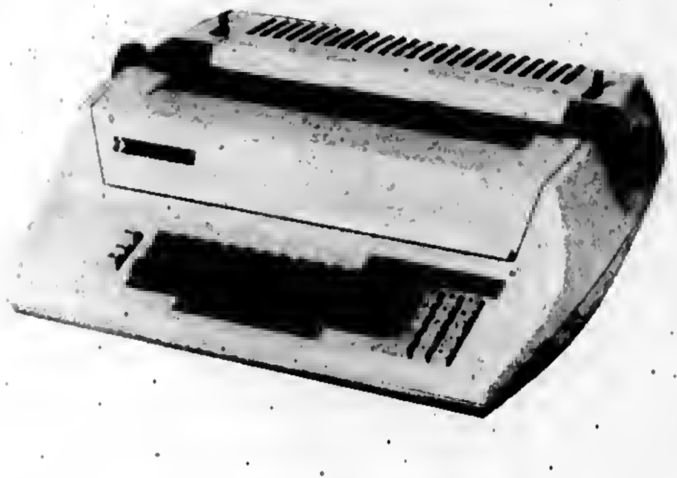

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NEWSPAPER

rnings Up For DP Brass

By Molly Upton
CW Staff

NEW YORK – Top systems and DP executives placed second only to top financial planning executives in the increase in total compensation received during 1976 compared with 1975, according to *Executive Compensation*, a book by the Financial Executives Institute here.

Top financial planners averaged a 13% increase in compensation, but hard on their heels came DP executives, with a 12.7% rise, followed by general accounting executives, who posted an 11.6% gain, according to the survey of nearly 1,200 companies. The average increase for the middle-management sector was 11.4% in 1976.

(Continued on Page 4)

Work, Welfare Rolls Matched

Privacy Backers Hit HEW Project

By Edith Holmes
CW Staff

WASHINGTON, D.C. – A federal program using computer technology to purge the nation's welfare roll of cheats could also undermine the privacy of individuals' records held by the government, privacy advocates here have warned

Directed for the time being at federal employees, Project Match is a Department of Health, Education and Welfare (HEW) program designed to reduce welfare fraud and abuse by identifying and taking action against those employees who are illegally receiving funds from the Aid to Families With Dependent Children (AFDC) program.

An initial raw match of payroll and welfare records has found 26,334 HEW employees receiving both salaries and welfare funds. HEW Secretary Joseph A. Califano Jr. has pointed out, however, that many of these people – especially those with large families and those who hold lower paying jobs – receive such funds legally.

However, plans are in the works to match private sector employer records with the welfare rolls as well.

'File Cabinet Mentality'

Members of Congress and the Privacy Protection Study Commission are questioning the approach HEW is taking with Project Match. They fear that individuals' expectation of confidentiality for the records held by the U.S. will be sacrificed for efficiency and the department's determination to prove that major social programs can be managed effectively.

David F. Linowes, former privacy commission chairman has called the extension of Project Match to private employer records "an abuse of personal privacy rights."

Califano exhibits "a file cabinet mentality" in his failure to recognize that "the biggest threat to personal privacy today is computer-to-computer linkage," Linowes charged.

Rep. Richardson Preyer (D-N.C.) has written to the Office of Management and Budget (OMB) asking that federal agency to clarify the Privacy Act and the Freedom of Information Act grounds on which agencies such as the Civil Service Commission and the Department of Defense have turned their personnel files over to HEW for Project Match.

For Califano and HEW's Office of the Inspector General, which handles Match, the issue is the need to improve "taxpayer confidence that federal funds are being spent wisely."

Processing on an IBM 370/168 at its headquarters here, HEW has completed the initial runs for 21 selected jurisdictions with high AFDC rolls and concentrations of federal employees. These jurisdictions include 18 states, New York City, the District of Columbia and the Norfolk and northern areas of Virginia; they represent 73% of all AFDC recipients and 68% of all federal civilian employees, Califano said.

Of the 26,334 raw matches HEW has found, 13,354 represent employees currently on the federal payroll, 12,980 have left government work

(Continued on Page 8)

Compares to IBM 30 Series

HIS Restructures Level 68 Line

By Frank Vaughan
Don Leavitt
And Ronald A. Frank
CW Staff

PHOENIX – Honeywell Information Systems, Inc. has restructured its Level 68 large-scale line to offer what the firm claimed is performance ranging from 125% of the IBM 3031 to 125% of the 3033.

The Level 68/Distributed Processing System (68/DPS), which has four different levels of power – the fourth of which also offers dual- and triple-processor configurations – replaces the Level 68/60 and 68/80 models, introduced in 1975 and 1974 respectively.

The 68/DPS Level 1 offers 25% greater performance than the IBM 3031 and 15% more than the HIS 68/-80, HIS said.

The 68/DPS Level 2 system outperforms the Level 1 by 55%, the Level 3 configuration outperforms the Level 1 by 235% and the Level 4 single-processor configuration outperforms the Level 1 by 325%, the firm claimed.

The Level 4 single processor's performance is said to be 90% of that of the 3033.

By adding a second processor to the Level 4, users can gain 18% to 22% greater performance than that available on the single-processor Level 4, the firm claimed. Adding a third processor gives another 18% to 22% boost in power over the dual-process configuration, a spokesman explained.

However, the firm refused to give out cycle times, clock speeds, memory access times, throughput or benchmark data to support its performance claims, saying that information was proprietary.

The Level 68/DPS is a Multiplexed Information and Computing Service (Multics) system. Major characteristics of a Multics system, according to Datapro Research Corp., include "access to the system through remote terminals as the normal means of system access, multiprocessing with dynamic reconfiguration capabilities, a unique hardware-based ring structure that provides security for sharing of programs and data, a tree-structured hierarchy for organization of user and system storage and the availability of multiple programming environments and user interfaces within a single system."

No new Multics capabilities have been added, according to HIS. However, existing capabilities have been expanded, the spokesman said.

Few Software Surprises

Despite a choice of words in its announcement that indicated major changes in the software available under Level 68/DPS, HIS appears to have very few surprises in this area There are no new languages and programs written in Fortran, Basic or

(Continued on Page 4)

U.S. Dragging Feet on Issue Of Transborder Data Flows

By Edith Holmes
CW Staff

WASHINGTON, D.C. – The U.S. is continuing to talk about "studying" transborder data flows while European governments are designing privacy legislation that will keep their information at home.

Direct U.S. participation in the writing of an international agreement regarding privacy or any other aspect of transborder data flows "may" be in the country's best interests, Dr. Oswald H. Ganley, the State Department's deputy assistant secretary for advanced and applied technology, suggested at a recent National Science Foundation (NSF) meeting of federal information managers here

At the same time, the French senate began debating the provisions of a national privacy act which passed the lower house of that country's legislature early in October.

What began as a liberal privacy bill in the French legislature earlier this year was "revised drastically" to become "a very protectionist" measure, U.S. observers in private industry said.

As the French Senate began meetings on the bill just a week ago, the country's private sector was objecting strenuously to the measure's conservatism. What will happen to privacy in France remains uncertain, the U.S sources stated.

France is one of several countries moving ahead with privacy legislation which could hurt U.S business interests abroad by keeping data within national boundaries, according to in

(Continued on Page 6)

N.Y. Nixes Tax On All Software

By Molly Upton
CW Staff

ALBANY, N.Y.– The New York State Tax Commission has ruled that both proprietary and custom software are intangible and therefore not subject to state sales tax

The ruling came on the heels of the commission's decision to assess taxes on time-sharing services based on the nature of the transaction rather than across the board [CW, Oct. 27].

The commission is rewriting the state regulations and will scratch the assessments it has issued, Commissioner Thomas H. Lynch said, adding those with assessments in these areas should wait for official notices being prepared by the department.

Lynch has no illusions that the tax problems presented by DP have all

(Continued on Page 8)

COMPUTERWORLD
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Moving Data via Satellite

SBS Testing Services at User Sites

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. – Satellite Business Systems (SBS) has begun test demonstrations of the services it plans to provide to business users in the early 1980s.

Data communications is a major part of the Project Prelude tests scheduled by three large telecommunications users between now and January. The tests, being held primarily to demonstrate the SBS service concepts to corporate users, are the forerunners of the commercial services that will be offered by SBS.

Usign the same Hewlett-Packard Co. 3000 Series II Model 6 processor systems at each site, the satellite project will demonstrate such applications as high-speed file transfers and terminal access of remote data bases, according to Larry Hartge, Project Prelude director at HP.

The DP portion of the project is divided into three parts, designed for general management, DP management and "document distribution management" at Rockwell International Corp., Texaco, Inc. and Montgomery Ward and Co., Inc.

At each company, two corporate sites will be selected for installing transportable earth stations in a parking lot. The earth stations will be connected to an indoor conference room where the HP systems and other equipment for voice, facsimile and TV will be shown to visitors.

The first series of demonstrations is taking place between Rockwell facilities at Seal Beach, Calif., and Pittsburgh, Pa. Based on preliminary results, Rockwell is giving serious consideration to utilizing satellite communications services when they become available commercially, a company spokesman said.

Scrambled Data

The HP 3000 CPUs used for the satellite test have 256K bytes of storage, disk and tape subsystems, a 600 line/min printer and CRT terminals. Standard DS/3000 software is being used, according to Hartge, to demonstrate high-speed transfer of data bases between the CPUs.

Each data base is made up of the names of visitors to the demonstration. The data base is then transferred from one CPU to the other at 1.544M bit/-sec using Harris Corp. Model 5228 modems designed for satellite use, according to James Hays, principal engineer at Harris.

Although data will be sent in large block sizes, the Harris equipment will scramble the information. This will make the transmissions look like a "continuous pipe" to the receiving modem, Hays explained.

The use of data scramblers will eliminate the dead time that would otherwise appear on the link between data blocks, he said.

Other DP tests in the satellite demonstration project include use of the HP equipment to retreive remote data base information in both alphanumeric and tabular format and use of a text-editing system to create a letter that will then be distributed to show the potential of electronic mail, Hartge said.

Project Prelude is being operated on the Communications Technology Satellite of the National Aeronautics and Space Administration; the satellite transmissions are using the 12- and 14 gHz bands of the frequency spectrum.

SBS expects to begin operations in 1981 with its own satellite.

Omnibus Bill Introduced To Spark Privacy Concerns

WASHINGTON, D.C.– In hopes of "stimulating discussion about the need for increased privacy protection," Rep. Richardson Preyer (D-N.C.) has introduced the Omnibus Right to Privacy Act of 1977 in the House of Representatives.

The 12 bills consolidated into the omnibus package and known as H.R. 10076 remain largely unchanged from the original versions introduced since July 12. The major exceptions are in the areas of government access to records about individuals and confidentiality of medical records.

The passage of this omnibus bill would mean recordkeeping changes for medical care providers, banks, consumer credit reporting organizations, educational institutions and insurance companies as well as federal agencies.

In introducing the bill, Preyer said he was "not endorsing any or all of the [Privacy Protection Study Commission's] recommendations" or presumably, the contents of the bill.

"It is too early in the legislative process for final judgments," he added.

Preyer's Subcommittee on Government Information and Individual Rights will begin "detailed examination of this legislation" after the first of the year, and "I hope that other committees with jurisdiction over privacy-related issues will follow our lead," he said.

As for changes from the original bills, the section dealing with government access to individuals' records maintained in both the public and private sector was amended to include telephone toll records in its list of personal records which the government may not obtain without subpoena.

The other sections remain generally unchanged.

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- **COBOL WRITTEN EXITS — The capability to write sort exits in COBOL, Fortran or PL1.**
- **Control cards for three very useful features:**
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DP Jobs on Increase

NEW YORK — Most "sizable" firms that participated in a recent survey said their DP employment will either increase or remain stable in 1978.

Respondents to the survey that covered all types of jobs also ranked DP functions as the second most difficult to fill, with engineering first, according to Deutsch, Shea & Evans, Inc., a human resources consulting firm here.

Of the 201 firms responding, 38% indicated they expect to hire more DP people in 1978, while another 38% said they expect the size of their DP staffs to remain level.

Two percent expect the size of their DP staffs to shrink, while 1% didn't know and 21% either didn't answer the question or said the question didn't apply.

Forty-seven percent of the firms responding employed less than 1,000 employees, Deutsch, Shea & Evans said in describing the respondents as "sizable."

Forty-eight percent of the respondents indicated engineering jobs were the most difficult to fill, but 24% cited DP jobs as the most difficult. In many instances, there were multiple answers, the surveyers noted.

Overall, the hiring picture appeared positive, with 51% of the firms indicating they plan to expand the number of employees. Forty-four percent said they plan to add engineers. DP and engineering therefore appear as skills in demand compared with others, such as management. Most respondents — 70% — indicated they plan to keep their management staffs level, and only 14% plan expansion in this category, according to the survey.

Top DPers' Earnings Rise

(Continued from Page 1)

Although the top DPer's average base salary grew 9.4%, his average bonus rose 50%, the statistics showed.

About 52.5% of the respondents indicated they pay bonuses to the middle-management group of executives, and 56.6% of the 631 firms answering questions about DPers' salaries pay bonuses for their top DP executive.

Among the middle-management personnel listed were top executives in charge of financial relations, general accounting, taxes, financial planning, systems and DP, budget, internal audit and credit & collection. Also included were the corporate insurance executive and the cash management executive.

The DP executive ranked fourth in terms of average compensation among firms giving bonuses, the study showed.

The tax executive and the financial planning executive tied for first with an average of $52,100, followed by the tax executive with $47,700. The systems and DP executive weighed in with $42,300, followed by the internal auditor executive, who averaged $38,500, according to the survey.

Firms offering bonuses paid their middle management better than those that did not, with the exception of the very large firms doing over $5 billion in business.

The average bonus as a percentage of base salary for top DP executives was 21.6%, according to the survey. For companies giving bonuses, the DPers' average base salary was $34,800 with an average bonus of $7,500, while companies without bonuses paid an average salary of $30,500, according to the results of the survey.

As expected, the larger firms pay their DP executive more than the smaller ones. Salaries including bonuses ranged from $27,700 in firms with revenues of $25 million to $50 million, to $42,300 in firms of $200 million to $500 million, to $77,600 in firms over $5 billion, the study indicated.

The study is available from the Financial Executives Institute, Inc. for $35.

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WANG

HIS Reacts to IBM 30 Line With Revamp of Level 68

(Continued from Page 1)

Cobol for the old Level 68s systems are object-code compatible with the new environment, a spokesman said.

Data files may require reformatting, but HIS expects to provide a utility program to handle that task, he added.

The company claimed to have a "new approach for data base management" including a "fully implemented relational data base management capability" plus an IDS/II facility "based on the Codasyl standard." A Multics Data Base Manager with similar capabilities was, in fact, announced for the old Level 68 CPUs more than a year ago [" 'MDBM' Backs Network, Relational Data Approaches, CW, Sept. 9, 1976] and, apparently, has already been installed in at least one location.

Also claimed as new but listed in independent references as long ago as August, the end-user-oriented Logical Inquiry and Update System (Linus) is said to be a self-contained data base manager, unrelated to either IDS or MDBM. Linus supports the novice in retrieval and updating tasks, the spokesman explained.

Other Enhancements

Other enhancements claimed by HIS for the Multics/Gcos control software include new modules for management of on-line computing and facilities for dynamic reconfiguration (apparently to change the environment available to any given user, somewhat along the lines of IBM's Virtual Machine Facility [VM/370]).

Still other software extensions include facilities supporting "dynamic metering and tuning," "isolation of user workloads" and "guaranteed response and turnaround time for priority applications," the spokesman added.

First release of Level 68/DPS software will be available in the U.S. in the second quarter of 1978, the company said. Gcos is provided with the user's hardware but all other software is separately priced.

License fees include $1,000/mo for Linus and $1,050/mo for the basic relational portion of MDBM. Users requiring network-oriented data bases face an additional cost of $200/mo, bringing the complete MDBM license fee to $1,250/mo.

Communications Functions

Communications functions for the Level 68/DPS include resource-sharing between DPS machines and "foreign hosts" using both "direct" links and private-line nets, HIS said.

The system can operate in packet-switching networks with X.25 and HDLC protocols. Enhanced Multics functions include electronic mail, word processing and teleconferencing, which can operate on packet nets "between multiple remote terminals," but such implementations have not yet taken place, a spokesman said.

The DPS system includes an integrated communications processor which provides most of the capabilities of the earlier 6678 Datanet front end. The integrated processor handles up to 96 lines, after which 6678s can be added to a DPS system. A full range of line interfaces and terminal equipment previously supported in Level 68/60 and 68/80 can operate on the 68/DPS system, HIS said.

Performance Upgrades

Upgrades to different performance levels are accomplished through a change in some logic and memory, the spokesman noted. Going from performance Level 1 to performance Level 2 costs an additional $9,670/mo on a five-year lease or $512,000 if the upgrade is purchased. The move from Level 2 to Level 3 costs $11,700/mo or $573,000. A Level 3 to Level 4 upgrade costs $9,075/mo or $555,000, and each additional CPU that is added to Level 4 costs an extra $7,765/mo or $474,000.

A basic Level 1 system, with 512K words of memory, a communications processor and console costs $31,900/mo on a five-year lease or it can be purchased for $1,259,000 with a $4,124/mo maintenance fee. Additional memory, which comes in 256K-word increments up to the 1M-word level and 512K-word increments up to the 16M-word level, costs $110,000 per 256K word.

A more powerful communications processor, which comes with 65K words of memory, costs $190,870 or $3,489/mo.

At the fourth level, the 68/DPS has a purchase price of $2,899,000 with a monthly maintenance fee of $7,777. The system leases for $62,345/mo.

Level 68/DPS models and first releases of software will be available in the second quarter of 1978, the spokesman said, noting that 68/80s can be field-upgraded to 68/DPS systems.

Itel Adds Another AS/5

SAN FRANCISCO — Itel Corp. last week extended its Advanced System (AS) family of mainframes with a system it claimed has power "equal to or greater than" the IBM 3031 CPU.

The Model AS/5 Model 7031 is also rated 10% to 20% more powerful than the AS/5-3, Itel said.

The Model 7031 features a processor cycle time of 100 nsec and expanded reloadable control storage, according to a spokesman. Up to 8M bytes of monolithic main memory can be attached to the Model 7031 in 1M-byte increments, he added.

A 32K high-speed buffer memory and a 128K entry translation lookaside buffer are provided to enhance processor execution Itel noted.

Users with AS/5 Model 1 and Model 3 or the AS/4 can reportedly upgrade to the Model 7031 in the field.

First deliveries of the AS/5 Model 7031 are scheduled for the fourth quarter of 1978. A typical 2M-byte system will cost $1.1 million, Itel said from One Embarcadero Center, San Francisco, Calif. 94111.

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Firm Claims in Survey

CDC Plans No Hike in South Africa Spending

By Molly Upton
CW Staff

MINNEAPOLIS — Control Data Corp. was the only computer firm responding to a survey by the United Church Board for World Ministries (UCBWM) that indicated it does not plan to increase its investment in South Africa.

The exception to this principle, CDC added, is a large-scale computer-based education system for blacks in South Africa for which it has allocated funds and is seeking cooperation from the U.S. and South African governments.

CDC, Burroughs Corp., IBM and Honeywell, Inc. responded to the survey of 47 multinational firms conducted by the UCBWM, which asked for corporate withdrawal of investment from South Africa. None of the respondents indicated they had plans to withdraw, the church said.

CDC said it sees the proposed educational program as "the most practical means of bringing about a significant closure in the education gap and hence the opportunity gap for millions of underprivileged people."

Commenting on its current operations in South Africa, CDC indicated that although the operation is small, it considers that it has helped stimulate progress in working and living conditions for the families of its employees.

CDC's objective in South Africa has been to assist, through its business and employment practices, the progress in the living conditions of the deprived population there, according to the firm.

Six Principles

The DP firms' responses included support of six principles prepared by Leon Sullivan, a black minister, which call for fair employment, equal pay, more supervisory training and jobs for nonwhites and improvements in employees' living conditions.

Burroughs indicated that it was instrumental in drafting the six principles, which it supports, and that it feels withdrawal would be counterproductive.

Corporations can be effective in improving employment levels and the standard of living, the Burroughs reply explained, according to a spokeswoman for the UCBWM.

Honeywell President Edson Spencer cited the adverse effects of withdrawal, such as increased unemployment, which would harm the blacks, the spokeswoman said.

IBM supported the six principles and indicated that where necessary, it will modify its current policies in South Africa to comply with the principles.

IBM also stated that it does not bid for business where it believes its equipment would be used to abridge human rights. The firm said it believes a corporation should be free to do business in any country where it is acceptable to the U.S. government.

Withdrawal for political motives would represent a corporation injecting itself into the conduct of foreign policy, the IBM statement indicated.

U.S. Trailing on Transborder Data Issues

(Continued from Page 1)

dustry representatives attending the NSF meeting.

Ganley expressed the new sense of urgency with which the State Department is treating the European determination to come up with an international convention dealing with privacy and the transnational movement of information. "Until a few weeks ago, the European and the U.S. efforts in this area were leisurely," he said.

But the decision by one of the European organizations involved — the council of Europe — to direct its committee of experts to come up with a draft convention in two years has put all concerned countries under time pressure, Ganley stated.

The U.S. must decide how to deal with the fact that it is not a full member of the Council of Europe and therefore will have no role in the political discussions that will mold the final draft convention. Ideally, a U.S. effort in this area would be transferred to a European organization in which the U.S. does enjoy an equal status, the Organization of Economic Cooperation and Development (OECD).

March Meeting Set

The chief U.S. organization formed to deal with the Europeans on the transborder data flow question, the Ad Hoc Interagency Task Force on Transnational Data Flow, met for the first time late last month under the auspices of the National Security Council.

Out of that meeting came the determination to hold an intensive two-day conference in March on this issue. Sponsored by the State Department and the Commerce Department's Office of Telecommunications (OT), the conference on transborder data flows is currently in the planning stages.

In a related development, the OT is busy compiling, translating and abstracting for public use the available foreign national privacy laws. This effort should be completed sometime next month, according to a Commerce spokesman.

While these official U.S. government efforts have encouraged some, they have not convinced other observers that what they believe to be European efforts to use the privacy issue to mask concerns for national sovereignty and protection of national computer and communications industries will be effectively challenged in time.

The interagency task force "has yet to get its act together," according to sources close to the work of that group. "It is nothing more than a facade with no resources to work with," they said.

Similarly, the OT currently has no funds budgeted for the study of transnational data flow issues.

Representatives from various segments of the industries affected by the movement of information across national borders — data base creators and suppliers and specialized communications carriers — urged the federal information managers attending the NSF meeting to become involved in these issues. They contended U.S. business opportunities are already being lost.

The managers were invited to make suggestions for the conference the interagency task force has planned and to comment on a 22-page position paper on the subject, written by the State Department's Morris Crawford and entitled "Protecting Privacy in International Data Processing."

Whatever the U.S. strategy turns out to be, interests other than those of the private sector should be included in such policy formulation, one participant said.

Another urged a reconciliation of the interests of the creators and communicators of information within the U.S. and between the U.S. and other nations.

Ultimately, transborder data flow issues must fit into the context of a U.S. information policy, several NSF meeting participants agreed. "We can't get anyone to talk about the total issue," one said, noting the "unwillingness" of the highest levels of government to look at the formulation of such a national policy.

Federal information managers could play an important role in raising the level of consciousness on these issues, another participant suggested.

Without a firm policy and a specific contact in government on transborder and related DP, communications and information issues, the other nations of the world will continue to see the U.S. as weak and vulnerable in these areas, still another said.

IEEE Picks Getting

NEW YORK — Dr. Ivan A. Getting, president of Aerospace Corp., has been elected president of the Institute of Electrical and Electronics Engineers (IEEE).

Getting defeated Irwin Feerst 24,793 votes to 24,753, according to Donald T. Hess, chairman of the IEEE Tellers Committee.

Elected to the position of executive vice-president was Dr. C. Lester Hogan, who defeated Carleton A. Bayless 28,161 votes to 21,753.

Correction

In the CW Stock Trading Summary of Nov. 14, National CSS' week net change should have been up 1.75 after a two-for-one stock split.

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IBM Decides to Phase Out Operations in India

By Nancy French
CW Staff

ARMONK, N.Y. — Rather than sell 60% of its business in India to Indian stockholders, IBM World Trade Corp. has decided to phase out its manufacturing and sales branch there by mid-May, the company confirmed here last week.

The decision came after a long period of negotiation between IBM and the Indian government on the conditions under which the mainframer could continue to do business within that country [CW, Oct. 17]. The problem arose after India passed the Foreign Exchange Regulation Act, which permits 100% foreign-owned firms to remain in the country only if their sole operation is manufacturing devoted exclusively to export.

IBM's future presence in India will be "limited to a liaison office which the company will establish, subject to government approval, in order to be able to receive authorized requests for IBM products and services," the firm said.

All equipment presently rented from IBM will be offered for sale to the renters, the spokesman said, but he did not know what would happen in cases where users could not buy the equipment.

Future equipment orders would apparently be limited to purchases and would have to be approved by the Indian government, he said.

IBM's DP manufacturing operation will be discontinued within 60 days and its data center services, card manufacturing and DP maintenance operations "disposed of" — that is, sold to Indians. Those IBM India employees currently working for the firm would "hopefully" be employed by the new owners, IBM said.

The Indian government and IBM have reportedly signed an agreement to service IBM customers in India, "outlining mutual agreements on various issues including transfer of spare parts, tools and test equipment," according to a report from United Press International. However, an IBM spokesman here could not confirm this.

IBM is the second U.S. firm to announce plans to take such action since the Janata Party took office in March. The first was Coca-Cola, which withdrew because it reportedly would have had to reveal its cola formula to stay.

Last-Ditch Plan

In a last-ditch effort to remain in the country, IBM said, it offered to split its interests there into two companies. One, which would have been owned 100% by IBM, would continue the traditional marketing and maintenance activities, while shifting its manufacturing to an export-only operation.

The other company, with 60% Indian ownership, would take over IBM India's service bureau operations.

IBM also offered under the plan to support Indian technological development through a scientific center to be established for computer research.

The firm's proposal also included a facility for assembling and testing integrated circuit cards and a measurement and analysis laboratory for electronic components, both to be operated by an Indian government.

IBM would also have made IBM patents available to Indian organizations.

IBM Chairman Frank T. Cary called the decision to phase out the Indian subsidiary "a great disappointment."

Two Acquitted In DP Spy Plot

MIAMI — Two men charged with conspiracy in connection with a plot to transport technical data and military components to Soviet agents were acquitted of some of the charges and convicted of others — but both say they will press for a new trial.

A jury in federal district court here last week acquitted Carl Lutz Weischenberg and Carl Heiser III on charges of conspiring to export technical data contained on a Memorex 100M-byte disk pack.

The jury, however, did find the two guilty of conspiring to export a Litton 51 inertial navigation device without a license, according to Weischenberg's attorney, Richard Rachlin.

In addition, Weischenberg, a West German citizen, was convicted and Heiser was acquitted of the charge of failing to register as an agent of a foreign government.

Heiser faces a maximum sentence of five years and/or $10,000 fine while Weischenberg could face 15 years and/or a $20,000 fine, according to Steadman Stahl, Heiser's attorney.

The charges were initiated by an affidavit from an FBI agent alleging the two men were engaged in a plot to transport components of a cruise missile to Soviet agents [CW, Aug. 8].

After giving their verdicts, however, two jurors told Judge Joe Eaton they would like to enter different verdicts, according to Stahl. The foreman indicated he would like to change his vote to not guilty for Weischenberg on the charge of failing to register as a foreign agent.

The other member of the jury said she believed the men were not guilty on all counts. However, she said, she had not understood that she could have disagreed with the other jurors and voted not guilty, Stahl said.

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In 'Project Integrity'

HEW Using DP to Root Out Medicaid Fraud

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Department of Health, Education and Welfare (HEW) plans to use computer technology as much as possible in its efforts to root out fraud and abuse in federal programs.

In addition to "Project Match," an effort aimed at uncovering those federal employees who are illegally receiving welfare benefits, Project Integrity has been instituted to examine the computerized billing data of physicians and pharmacists seeking reimbursement for Medicaid services.

HEW has studied approximately 250 million bills submitted by 275,000 physicians and pharmacists during 1976 for Medicaid money. Project Integrity compares the services offered per patient with a set of standard procedures and practices of physicians and pharmacists, drawn up for HEW by a panel of experts, an HEW spokesman explained.

The computer is programmed to "kick out" those cases which go beyond the parameters set by the 22 physician and 26 pharmacist procedures and practices contained in the system, he said.

For example, if a physician indicates that a patient visited his office more than 40 times in one year, the system will flag that billing for further investigation, the spokesman said.

More than 20 home visits by the physician or more than one tonsillectomy for a patient would prompt similar investigations.

HEW has found 47,000 physician and pharmacist bills which described services that went beyond the limits set by the system. To test the usefulness of the computer in highlighting fraud, the department is now investigating 25 of these cases involving physicians and 25 involving pharmacists in each of the 49 states offering Medicaid.

There have been no prosecutions to date, but the investigations are ongoing, he said, adding HEW should have some results from Integrity soon.

Project Match Worries Privacy Advocates

(Continued from Page 1)

within the last 18 months.

The department plans next to verify the employment of these people with the government and to obtain their earnings records from the federal agencies employing them.

State and local officials will then be asked to determine — chiefly through state welfare agencies — whether these identified individuals are eligible for benefits and, if so, at what levels, the HEW Secretary explained.

Based on these determinations, state and local governments will reduce or terminate payments to those found ineligible. Prosecution may be warranted in some cases, but these decisions will be left up to the U.S. Attorney's offices and the Federal Bureau of Investigation.

Those AFDC recipients whose grants will be reduced but who will not face prosecution may be suspended, demoted or removed from their jobs, an HEW spokesman said.

D.C. Numbers

In the District of Columbia, where the city government and HEW have completed the project's pilot program dealing only with HEW employees, the department found 216 matching cases; 142 of these raised questions requiring further investigation.

Thus far 102 of those 142 cases have been fully investigated for welfare eligibility. Fifty-eight individuals are totally ineligible and either have been or will be removed from the rolls; 32 have had or will have their welfare payments reduced; two are being underpaid and will have their benefits increased; and 10 were found to be receiving the proper amount, the HEW Secretary reported.

HEW has yet to decide what criminal, civil or administrative sanctions will be taken for those receiving more than their fair share.

'Privacy Assured': Califano

Developed with the Civil Service Commission and the Department of Justice, Project Match "is conducted under procedures aimed at ensuring the privacy rights of all federal employees," Califano stressed.

To this end, HEW has assumed full custody of computer tapes and printouts, hand-carrying these materials to federal and state agencies wherever possible; the agency has also ensured that only senior staff in HEW and other governmental units have access to sensitive information, the spokesman stated.

In the next few months, other states and localities as well as the Department of Defense and a number of large corporations will be asked to participate. HEW hopes to make this an annual program, Califano said.

"Passage of the [Carter] administration's welfare reform plan — and the consolidation of the major income maintenance programs, AFDC, Supplemental Security Income and food stamps, in one set of computers — will increase the scope and effectiveness of such checks," he said.

While the computer tapes from the 21 participating jurisdictions are in hand, Califano has authorized Project Match officials to check records from states against one another to determine whether any recipients are "double dipping."

In the raw match done on Maryland, Virginia and the District of Columbia, 131 individuals were found receiving benefits in both the District of Columbia and Maryland; 16 in both the district and Virginia; 23 in both Maryland and Virginia; and six with benefits in two different locations in Virginia.

How far beyond federal employees HEW's matching efforts will extend remains questionable. Following an Oct. 13 meeting with members of business and industry, Califano reported that several large corporations had agreed to turn over their payroll records to the department for checks against the welfare rolls.

Representatives from both IBM and AT&T indicated they would not do so.

New York Nixes Software Taxes

(Continued from Page 1)

been solved."I'm certain we've chipped away only the tip of an iceberg because there's going to be a constant problem with this type of industry," he commented. "But at least we now have our philosophy straight and can proceed from there."

However, he added, "I'm ecstatic about what we've gotten done in this length of time." Members of the DP community first met with tax commissioners Aug. 23.

Time a Factor

The three tax commissioners voted 2-1 in favor of the decision to exempt software from taxation. One of the reasons for the decision was the length of time — 11 years — during which the state did not publish regulations regarding software taxation, Lynch said.

"The presumption shifts to the taxpayer ... and we're talking about equities and an extremely close question of law," Lynch said.

"It's a whole new state of art, a new business, and it hasn't been taxed for years ... I would be much more comfortable as an advocate in court arguing that programs are intangible property," he added.

Because the Department of Taxation and Finance recognizes new regulations will not make everything black and white for everyone, it has designated the Technical Services Bureau to answer taxpayer questions.

Users with questions can address their inquiries to Harris Sitrin, New York State Department of Taxation and Finance, Technical Services Bureau, Building 9, State Campus, Albany, N.Y. 12227.

Furthermore, to ensure that the regulations are easily understood and can be easily implemented, the commission is establishing a task force of industry representatives, Lynch said. Those interested in serving on the task force should write to Lynch at the Department of Taxation and Finance, Room 215, Building 9, State Campus, Albany, N.Y. 12227.

Lynch cautioned that the decision to exempt software from taxation will not apply to over-the-counter retail sales of programs for home TV games.

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User Sees Mini as Key to Data Entry Savings

By Jeffry Beeler
CW Staff

TORONTO — "Thinking small is fun; and you'll probably save a lot of money doing it," James H. Grant said here recently as he described the steps he and his colleagues took to implement "one of the best data entry systems around."

In an address on "Minicomputers in Data Entry" at the Canadian Computer Show (CCS), Grant, who is programming manager for the University of Western Ontario's Information Analysis and Systems Department, conceded that the punch-card system his staff currently uses is more than twice as expensive as the one they had before.

This increase in rental costs, however, has been more than offset by boosts in data throughput, he added.

His staff used to average 8,000 keystroke/hour. Today, that rate has jumped by 50% to 12,000 keystroke/-hour, Grant said.

Built around a Consolidated Computer, Inc. Key-Edit 1000, the system was installed in 1976 as a replacement for the Key-Edit 50 system that had been implemented the year before.

In installing the hardware, Grant and his colleagues insisted on maintaining tight controls that allow the operators of the system's 24 keyboards to keep track of the data that has been submitted for processing by the university's faculty and administrative users.

CW
at CCS

This control system consists in part of placing each batch of punch cards in its own uniquely numbered plastic bag, he explained.

The control system also consists of transferring data from disk storage to magnetic tape twice daily. This precaution ensures that the data entry department will never lose more than half a day's keypunching if the system breaks down, he said.

He and his associates have also programmed their punch-card system to automatically select the correct data entry format based on record identifiers entered at the keyboards by the equipment operators. The system currently accommodates 300 record formats, Grant said.

This automatic format-selection feature allows keyboard operators to spend 70% of their work time keypunching — an unusually high percentage, he claimed. It also allows systems supervisors to count keystrokes, records processed and total keypunching time.

In negotiating the contract for the system, Grant added a clause that protects his department from extended service charges.

When the time came to install the system, the programming manager posted installation deadlines. "When you announce publicly that you're going to do something by a certain time, you almost have to stick to your timetable," Grant said.

Besides the Key-Edit 1000 system, Grant and his staff considered installing a Key-Edit 50 system and an IBM 2740.

To evaluate these and other hardware alternatives, staff managers tested equipment at vendor sites and studied data entry systems at various user locations similar to their own.

NCC to Expand Exhibit Space

MONTVALE, N.J. — An auxiliary exhibit hall that can accommodate an additional 270 booths will be constructed for the National Computer Conference (NCC) scheduled from June 5-8 at the Anaheim (Calif.) Convention Center.

The "West Hall" will be completely air-conditioned, carpeted and well lit, and all exhibits will be column-free in order to duplicate the environment typical of an NCC exhibit, a spokesman said. Reservations for exhibit space in the hall will be taken from those companies currently on the waiting list for NCC '78. If additional space is available after these companies have been accommodated, it will be offered to other companies that fulfill NCC exhibit requirements.

The NCC committee has approved modification of a recently built carport at the center at a cost of about $100,000 because of the number of exhibitors that have requested space.

Modifications involve adding heavy-gauge canvas sides as well as lighting, carpeting and air conditioning, to the port according to a spokesman of the American Federation of Information Processing Societies, Inc., sponsors of the annual conference.

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Women Seen as Data Entry Managers

CW at CCS

By Jeffry Beeler
CW Staff

TORONTO — Women make better data entry managers than men, said R.A. Badley during the opening day of the Canadian Computer Show (CCS) here recently. Unfortunately, they account for only a relatively small fraction of their fields total work force, he added.

Badley, executive DP officer for the Mutual Life Assurance Co. of Canada, contended that women are better than their male counterparts when it comes to developing rapport with their subordinates. Badley said he based his opinion on first-hand observations of male and female data entry managers in action.

Badley's observations about the relative competence of men and women data entry managers underscored his comments on the importance of motivating clerical personnel in the typical keypunch or key-to-disk system environment.

Most companies treat the rank-and-file members of their data entry departments as second-class citizens whose working space is usually "somewhere in the bowels of the building," Badley said.

For this reason, data entry managers must take great care to keep the equipment operators in their departments as happy as possible, he explained.

The surest way to a data entry clerk's heart, of course, is through the pocketbook, but pleasant working conditions — draperies, carpets and other amenities — also provide an effective worker inducement, Badley said.

Managers can also motivate their employees by soliciting and respecting their opinions, the insurance company executive explained. "Data entry people aren't the dummies they're sometimes thought to be, and many can provide useful suggestions for overcoming department problems," he said.

Other goals he urged data entry managers to achieve include attracting capable personnel, maintaining high volume with quality output and minimizing costs.

In their search for qualified keyboard operators, managers should not automatically exclude men from consideration, as so often happens in data entry departments, Badley told listeners. Though not nearly as common as women at the clerical level, some men make excellent keyboard operators, he said.

Product Misses Its Own Debut At Toronto Show

By Jeffry Beeler
CW Staff

TORONTO — If you've ever lost a letter or a package in the mail, take heart — your problem could have been worse. And if you don't think so, talk to Bill Barrows.

Through no fault of his own, Barrows, a senior consultant for Control Data Corp., lost a cartridge drive in shipment. As a result, the product, which was supposed to make its North American debut at the Canadian Computer Show here recently, missed its own unveiling.

Barrows shipped the Model 9448 drive from its manufacturing site in Oklahoma City,

(Continued on Page 11)

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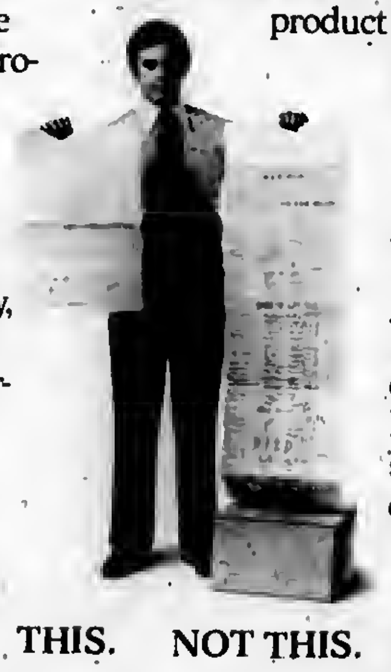

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CW at CCS

One-Time Hardware Investment

Cost Should Guide Choice of OCR, Users Told

By Jeffrey Beeler
CW Staff

TORONTO — If you're in a quandary over whether to install an optical character recognition (OCR) system, let cost be your guiding consideration, Tony Bloom advised at the Canadian Computer Show here recently.

Bloom is a marketing manager with OCR Concepts, Ltd.

Cost constitutes OCR's principal claim-to-fame as a data entry technique. The only major expense item associated with a system employing that technology is a one-time-only hardware outlay, Bloom said.

Depending on the variety of fonts it accommodates, an OCR system can cost from $1,000/mo to $150,000/mo, he explained.

The other overhead items like labor are insignificant by comparison. As a result, an OCR system's upkeep remains fairly constant even if the workload it is called upon to perform increases dramatically, Bloom said.

With keypunch machines as well as key-to-disk systems, the opposite is true, he said.

Looking beyond the cost question, the marketing executive advised prospective users to acquire an OCR system only if they can control the major variables of forms design and data presentation. Specific criteria they should meet include the following:

- Their applications must consist of a few, high-volume jobs.
- The data to be read must be mechanically produced.
- They must be able to control the design of the documents their reader will use.
- They must be able to control the form in which documents are submitted to the OCR system operators.

Users should avoid OCR equipment, Bloom continued, if the following conditions apply to their applications:

- They perform many small applications. The cost of programming the system to select the appropriate data entry format for each job will probably prove prohibitive, he said.
- Their data originates from many sources.
- They can obtain only a carbon copy of the data to be read.

Exhibit Misses Toronto Debut

(Continued from Page 10)

Okla., on Nov. 4, four days before it was scheduled to be exhibited. Because he sent the product by private air carrier, Barrows assumed it would reach its destination with plenty of time to spare.

But an unexplained delivery foul-up scuttled his plans. By the last day of the show, the would be exhibit still hadn't arrived, and all efforts to determine its whereabouts had failed.

To make matters worse, the incident here isn't the first time Barrows has been victimized by a shipping miscue. A similar snag occurred only last October in Munich when another 9448 arrived two days late for its European debut at the System 77 computer show.

"We looked and looked for the drive and finally found it sitting in a cargo hangar at the Munich airport," he recalled, shaking his head.

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What about reliability? One customer reported that he was experiencing "alarmingly little downtime" with his HP 3000. An explanation for this lies in our "fault control memory." This corrects memory errors while the computer is running and remembers where they occurred. During regular service, our engineer asks the computer how it's feeling and fixes any problems. But as far as you're concerned, the memory has been functioning perfectly all along.

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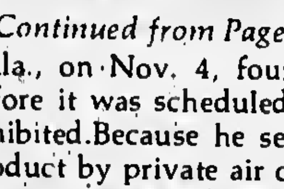

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IN DEPTH
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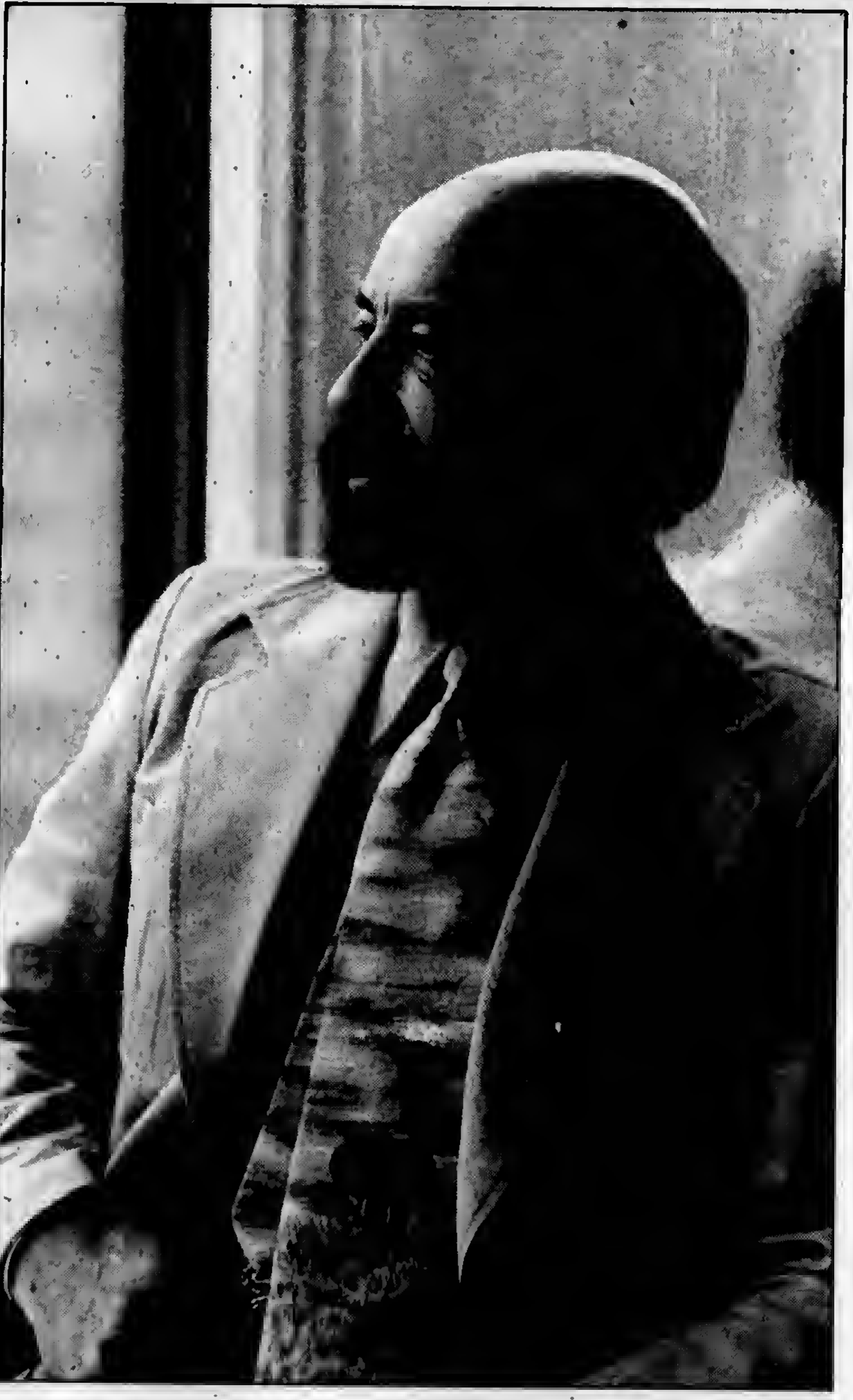
TSUNAMI

By Charles P. Lecht



Charles P. Lecht

While the frequency and size of the waves of technological and economic change increase, natural and not unexpected counterforces are building. These counterforces range across a spectrum from obviously long-term beneficial ones to others which potentially inhibit our ability to exploit our own achievements.

It is to be hoped that forces in the latter category constitute unusual phenomena. But out of the maelstrom of conflicting forces we should not be surprised to see the emergence of an undertow which may siphon U.S. technology offshore, only to return suddenly one day to swamp and neutralize the position of technological leadership we now hold.

With leadership in computer technology at least as valuable as the possession of oil or gold in ensuring our position as a world power, it seems important that we re-examine our short-range socioeconomic priorities to bring them more into line with our long-range interests. For many defenders of our socioeconomic and political systems suggest that, as the waves of change in computer technology are increasing, concomitant world political unrest bespeaks an increase in a larger international strife as well.

Whether or not we accept this view, as world powers test their strength, it would be ill-advised for us to ignore that rapid change is occurring and that some of the currents of this change are not flowing in furtherance of our best interests.

It seems beyond argument that social, economic and political unrest are on the upswing. Prudence suggests that, even if they finally do resolve themselves into a future of peace and plenty, we keep our guard up until we can be a bit more sure of the outcome.

While we await a global reconciliation, commodities may be less valuable in our brave new world than are the means of their control. For example, Iran will be hard pressed to utilize its vast oil and gas resources internally in the next century (especially with low-cost atomic reactors on the horizon), but it nonetheless wields enormous power by controlling their flow to deserving (or at least politically convenient) nations.

With most of the world's computer technology heavily influenced, if not directly controlled, by U.S. companies (with a disproportionate amount of this influence emanating from IBM, and not insignificant amounts flowing from the other giants of world computer technology — namely Univac, Burroughs, NCR, Control Data Corp., Honeywell Information Systems and Digital Equipment Corp., we, like Iran, are in a highly influential position with respect to the use of our commodity (in this case computer technology.)

It would be naive of us to believe that those who *willingly* depend on our computer technology are not aware of this, while those who *have no choice* but to do so, because of lack of access elsewhere, are intensely aware of this. And it is only the most naive who believe that the privileged position we occupy by virtue of our level of technological achievement can be leapfrogged with ease.

However young our industry is, we represent the most seasoned body of know-how in the manufacture and usage of computer systems to be found anywhere.

This leadership position will not be easily overcome by non-U.S.-based companies without assistance from ourselves, although some first signs that this situation is changing in various sectors of our technology are beginning to be visible.

The recent success of Japanese manufacturers in hand-held calculators, xerography and in other electronics-based products clearly demonstrates that leapfrogging *is* possible — and happening!

Even if technological leapfrogging is on the rise, it is still the exception mode. However, as we shall see in this book, U.S. governmental intervention in our computer industry seems to be increasing rapidly.

Depending on the ways in which this intervention manifests itself, our frog may find that it is being held still just long enough to be walked over at leisure by a well-coordinated tortoise, a tortoise unfettered by our labor, social and other rules.

And contrary to our own government's apparent mode of intervention in our technology, the intervention of foreign governments in *their* technology-producing industries supports them to the hilt an accelerates their rate of improvement.

What can and will happen if these trends continue?

Like *The Waves of Change*, this new work is a technoeconomic analysis of the world computer industry and its user community. At the same time, it presents more of the sociopolitical implications of our technology.

While I say "world," I am the first to admit that, in certain areas of concern, I, as well as you, may be drawing my opinions from a well of ignorance too eager to be tapped. But I feel that incorrectly stated hypotheses represent less of a danger than does the lack of any hypothesis whatever.

Anyway, however provisional the idea expressed here may be, I believe most to be essentially correct and the others to be on the right track. If an idea is downright incorrect, I apologize at the outset; it is an imperfect world.

And, while I may seem more concerned with world technology in this book than I ought to be, the reader should understand that this is the case less by design than by simple necessity; to comprehend developments at home, we are compelled to look abroad for the fullest possible explanations.

Each chapter will address what I believe to be overriding factors in our consideration of today's endless panorama of computer technology. Needless to say, our preoccupation with today may be better understood through historic perspective, but with ever greater portions of history consuming ever smaller amounts of time, current happenings seem to be substantially more important to our quest for a meaningful vision of the future.

The waves of technological change affect not only the DP community, but the social, economic, political and psychological climates of the world. This week and in the weeks ahead, Lecht will probe the nature and extent of those changes.

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

Charles Philip Lecht is founder, president and chairman of the board of Advanced Computer Techniques Corp. (ACT), a computer software consulting firm.

Lecht holds a B.S. in mathematics from Seattle University and an M.S. degree, also in mathematics, from Purdue. His involvement in the computer field stretches back to 1951, making him an "old-timer" in a very young industry.

Among his earliest professional activities were programming for IBM's service bureau and for the MIT community's Lincoln Laboratory/Mitre organizations on a variety of scientific and military simulation projects.

From 1960 to 1962, Lecht served in the U.S. Army Ordnance Corps, first as chief of its Programming Division and subsequently of its Mobilization Applications Division.

Lecht came to New York City in 1962, where he founded ACT. In the 15 intervening years, the company has grown from a one-man show to an international complex employing some 400 persons and deriving more than 50% of its revenues from operations in Europe, Canada and the Middle East as well as the U.S.

In addition to building and presiding over ACT, Lecht has found time to hold a number of teaching posts, author five books and innumerable articles and maintain a heavy schedule of speaking engagements in the U.S. and abroad. His books include three on computer languages, one on project management and a technoeconomic analysis of the computer industry, *The Waves of Change*, which was serialized in excerpted form in *Computerworld* this year and will be published by ACT next month.

Lecht is a member of the Young Presidents Organization, The Hudson Institute, the Data Processing Management Association, Association for Computing Machinery and the New York Academy of Sciences.

In 1976, Lecht was designated by "The Gallagher President's Report" as one of the "10 best businessmen in the U.S.A." representing companies with income below $1 billion. Profiles of Lecht have appeared in *The New Yorker* and *Datamation*, among other publications.

Most recently, Lecht has been requested by the Computer and Business Equipment Manufacturers Association to argue its case against the proposed I/O interface standard before Congress.

In any event, I and those who are helping me prepare this book have a great desire that it add to and enrich your understanding of computer technology. Where it proves inadequate, the reader is encouraged to improve upon it by interpolating his own ideas.

While *Tsunami* appears with my name as author, it might be more accurate to describe me as originator, orchestrator and participating author. While many have joined to give it life, none played more important roles than Robert Fertig, vice-president of Advanced Computer Techniques Corp's (ACT) Technology Analysis Group, and Carl Menkel, Manager of ACT's Documentation Services Division.

I

The once relatively clear roles of government as user, promoter and regulator of industry seem to be blurring. Let's take a closer look at this for, in some ways, it represents an overriding factor in assaying the future of our industry.

While addressing the role of government in general, we will chiefly have recourse to the U.S. government for specific supporting examples, in recognition of its (current) primacy in the arena of computer technology-related developments worldwide. Given the complexity of this issue, I must, at the outset, beg the reader's patience in evaluating my point of view; we all know the risks of holding opinions with which we can be too readily identified. Although they are surely vulnerable to counterarguments, I nevertheless believe the following ideas represent more than a casual elegy on the subjects addressed.

In contrast to the latest positions apparently taken by the U.S. government wherein most of its policy preoccupations vis-a-vis U.S. computer technology seem of either a restrictive or punitive nature, European and Asian governments are rallying around their indigenous industries. This constitutes a reversal of government vs. private sector positions with respect to domestic and foreign government/DP interactions and suggests that broader international issues, involving such factors as balance of payments, alliances, even our defense posture, are undergoing change.

Thus, we seem to be racing headlong into a situation wherein we may well have to adopt, during a period of relative calm, the kinds of measures normally reserved (under *our* law) for periods of national crisis. These include ideas that strike at the heart of our socioeconomic system including antitrust law abridgments, privacy law curtailments and so on. For flowing through the ever-expanding networks of electronic technology from which technology great benefits may be derived are the means to wreak national and international havoc in ways unanticipated in earlier, essentially mechanical, times.

While not new, the emergence of this problem as a significant element in the equation began with technological improvements to aircraft and reached an alarming level with our manufacture of atomic reactors. At this point, it seemed as though we had finally concluded that too much technical sophistication combined with too little personal sophistication might be dangerous — and we still scurry to find ways to eliminate the possibility of triggering a nuclear conflict in a moment of "accidental" madness.

However, with computer technology, it's the first time that the entity serving to promote this phenomenon has been so invisible, while at the same time so obtainable by almost anyone. Spreading communications capabilities, as currently conceived, provide us with the means to create de facto violations of precomputer/communications era laws and statutes, both national and international.

Can anyone doubt this when — today — from a small office anywhere in the U.S.A., a telex service can be activated for global communications piggybacked upon the environments provided by time-sharing organizations, including (with little additional hardware) message switching with ring-up?

We find no conflict in the fact that an organism must take time to locate and/or cultivate sources of nourishment, as well as reserve time for the digestion of its food; it is obvious that both categories of activity are essential to survival. From at least one perspective, this holds true for artificial as well as natural organisms; government is a case in point. If governmental viability is to be achieved with all this implies, social structures must seek a useful index to the state of their health in the balance struck, both through formal and informal compromises, between their creative impulses for a better *future* (the desire for change), and their equally compelling impulses to realize some benefit *now* (consolidating/capitalizing upon change).

It is a basic and proper function of government to encourage change so that our long-range goals and short-range needs are singly and jointly not compromised too much as we go about life's business. This is a complex task, wherein the goals are usually somewhat more easily identified than are the means by which they are to be achieved.

It seems incumbent upon the agencies of government which bear responsibility for developing appropriate recipes to derive the most benefit from change, to draw upon the best advice available as part of that process however incomplete it may be. In no other way can these agencies fulfill their functions as arbiters/synthesizers and analyzers of life-supporting processes.

In the purest sense, these agencies are controllers of Hegelian episodes in tearing down the old, regenerating the new and minimizing associated counterproductive noise. In order to fulfill this role, self-policing action must occur, a concept which, for the totalitarian government, remains a paradox at best, and for a democratic government requires an *almost* impossibly delicate interplay between the "by" and "for" of it all.

Practically speaking, such government participation involves the creation of rules and standards as well as the exercise of regulatory powers, all of them designed to serve the common interest. Frequently the efficacy of such measurescan only be known in an ex post facto way: some turn sour, hopefully before too much damage is

(Continued on Page 14)

(Continued from Page 13)

done, others prove themselves worthy in time ... even yielding multifold, unanticipated benefits.

As examples of the latter, the establishment of standards affecting the height of bridges and width of roads served to encourage the freer flow of commerce and general traffic, without imposing counterproductive constraints upon the industries/technologies involved in their production and usage. Others, addressing the permissible levels of radiation emission from our TVs and microwave ovens, the presence of nitrites and artificial sweetening agents in our food and so on, have arisen out of a legitimate concern for our health and well-being. In these and other instances, government action is taken for proven or probable cause.

Consider the Converter

On the other hand, the soundest motives on the part of government have brought forth goblins if not monsters. Consider the catalytic converter, a poor solution to a genuine problem, i.e., the pollution introduced into the atmosphere by automobile exhaust emissions. Millions of dollars (and automobiles) later, it appears to have been demonstrated that the imposition of the converter standard by government has led to the substitution of an even more toxic substance for the one that was to be controlled. Furthermore, it is reported that the catalytic converter standard seriously reduced gas mileage and automobile efficiency (by as much as 14% since 1967); and this at a time of growing shortages in the world's, or at least the U.S.', oil supply.

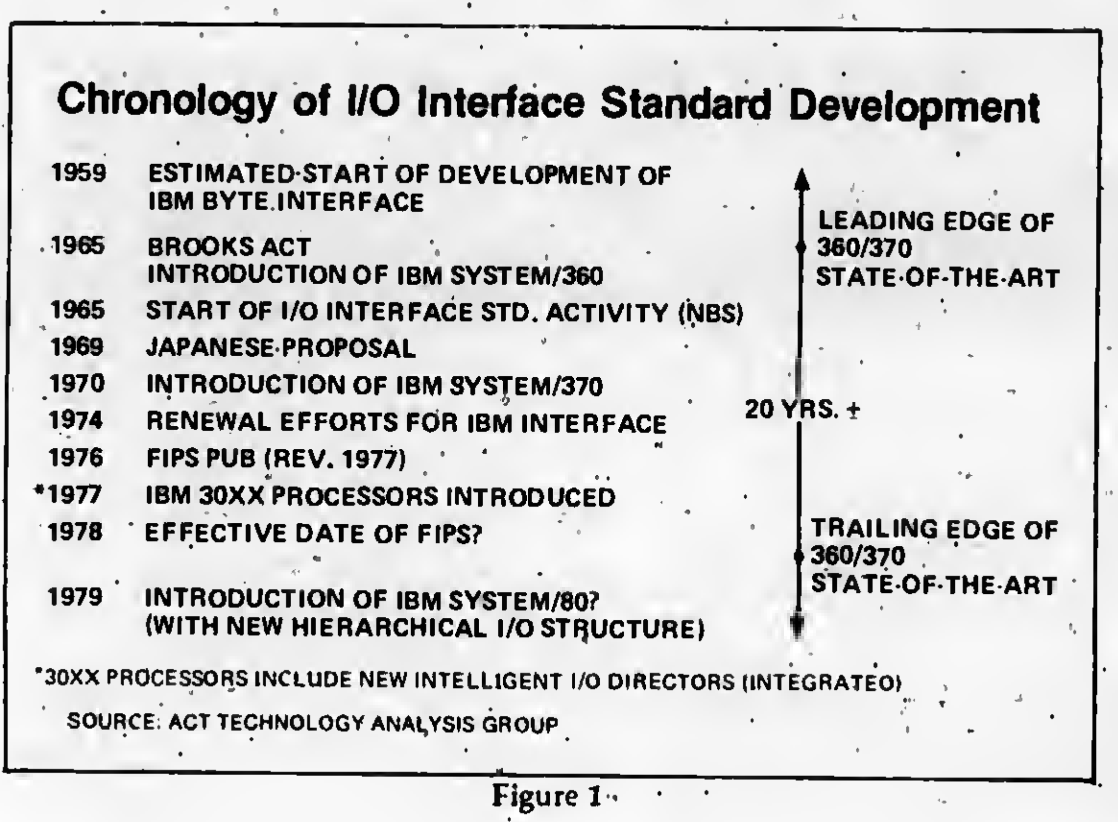
My reasons for citing these examples of beneficial results of government intervention in the activity and substance of free enterprise in the first case, and malignant ones from overreaction in the second, do not include a need to prove that government makes mistakes; why belabor the obvious? Government has a very difficult job to do.

I am not even arguing that there are too many rules, however good or bad these may be (although the 60,000 pages of regulations recorded in the *Federal Register* as of 1976 might easily tempt one to do just that). But I believe it is not unreasonable to conclude that some regulation by government is both inevitable and desirable.

Entertaining 'Spectaculars'

Musing ended. It is the thesis of this chapter that current governmental involvement in the U.S. computer industry is too uncoordinated, too tenuous and too variable in its depth to do either much good. Furthermore, the increase in public computer industry "spectaculars" suggests government action in recent years may have more entertainment value than real. Consider the following:

- After the Justice Department filed suit against IBM, a federal judge called in the two litigants engaged in possibly mortal combat (that is, mortal for *our* industry) only to ask why they were there.
- It was finally noticed that the National Bureau of Standards (NBS), an agency truly containing some of our most skilled computer scientists, has had little success in standards definition, let alone implementation, in the computer industry. This is a self-evident truth, not even contested by NBS. But the explanation given by many vocal spokesmen of why NBS could not get too much done seems to betray their preoccupations as being less with the technical aspects of the industry than with its promise as a vehicle to political stardom.



Chronology of I/O Interface Standard Development

1959	ESTIMATED START OF DEVELOPMENT OF IBM BYTE INTERFACE
1965	BROOKS ACT INTRODUCTION OF IBM SYSTEM/360
1965	START OF I/O INTERFACE STD. ACTIVITY (NBS)
1969	JAPANESE PROPOSAL
1970	INTRODUCTION OF IBM SYSTEM/370
1974	RENEWAL EFFORTS FOR IBM INTERFACE
1976	FIPS PUB (REV. 1977)
*1977	IBM 30XX PROCESSORS INTRODUCED
1978	EFFECTIVE DATE OF FIPS?
1979	INTRODUCTION OF IBM SYSTEM/80? (WITH NEW HIERARCHICAL I/O STRUCTURE)

LEADING EDGE OF 360/370 STATE-OF-THE-ART
20 YRS. +
TRAILING EDGE OF 360/370 STATE-OF-THE-ART

*30XX PROCESSORS INCLUDE NEW INTELLIGENT I/O DIRECTORS (INTEGRATED)

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 1

- The recent controversy regarding I/O interface standardization, an issue of major consequence to our technology, politics, psychology and economics, is so steeped in metaphor that the contestants cannot help but conclude that conspiracy is involved.

Less hypothesizing is needed to explain the anti-I/O position (at this time) than the position of those favoring the standard. Rep. Jack Brooks, who chairs the House Government Operations Committee and who heads the drive for adoption of the standard, seems singularly reluctant to solicit the opinions of our leading academic institutions and research organizations, not to speak of some of the leading and most scientifically oriented governmental bodies.

For example, to say the Department of Defense is for the standard when the Air Force is not raises questions as to whether the polled parties truly represent their constituencies. Anyway, in this whole affair, we cannot help but see a spectacular aborning.

We have already acknowledged the need, value and importance of governmental participation in our quest for better means to maximize the return on our DP achievements. But, as I stated above, the U.S. government has sent such inconsistent signals to the U.S. computer technology community as to what its true priorities are, or even as to whether these have been defined, that private industry's plans to exploit the waves of technological change crashing on the shores of our research establishments are being impacted while we wait for governmental clarification.

At the same time, the number of foreign manufacturers, many old and some new, subsidized wholy or in part by their governments, now able to afford the poker chip needed to enter the game for capture of the world marketplace, is on the increase.

With the dramatic, increasingly frequent technical breakthroughs in achieving high performance at low costs that are the rule these days, maintaining our own leadership role as the fountainhead of world computer technology is going to be increasingly difficult, if not impossible. Japan and underrated Germany have shown themselves to be no weak contenders, for example. We had better get our act together.

While almost any of the current U.S. government/U.S. private industry confrontations may be used to illustrate our problem, the I/O standards issue seems to capture the flavor of our thesis best. The discussion of this problem which follows is not intended to be all-embracing in its detail; within its technological and philosophical orientation the reader will detect any number of gaps and elisions. I say this to forestall the objections of those who may maintain that its bias, while intentional, is as defective as that of the Brooks committee.

At the same time, I believe it needs little more to support our main contention that current U.S. government involvement in our industry is generally not fully coordinated or thought out. That our argument also supports the anti-I/O standard position is almost incidental.

Sea of Controversy

It is self-evident that government is *obligated* to consult those who are intimately in touch with the pertinent technologies prior to building fences around them. For example, in the case of the proposed I/O interface standard, the Brooks committee, whether right or wrong on this vital issue, does not seem to have been able to eliminate the sea of controversy surrounding it. Too many competent organizations within and outside government flatly disagree with it.

Furthermore, lengthy protests made by technical experts at great expense, and consuming many hours of research, have too frequently been answered with terse, imperious dismissals. Thus, the argument *for* the proposed I/O standard is steeped in enough controversy that those highly committed to a different route (e.g., IBM, HIS, Univac, Burroughs, NCR, DEC and CDC) may rightly view its imposition as an act which fails to credit the integrity of their motives.

With IBM itself against the standard - curiously, because it is one which IBM designed and which exists on most IBM equipment (e.g., 360s, 370s and the new 30XXs) — the other manufacturers with far less resources must be all the more wary of it.

Indeed, in the private sector, all of the large U.S.-based mainframe manufacturers (save Cray, Amdahl and Itel) and most of the U.S.-based minicomputer manufacturers are against it. Those for it are essentially the U.S. plug-compatible manufacturers (PCMs) and the Cray, Amdahl and Itel organizations.

Also not surprising is a high degree of "noise" from abroad, the purposes of which vary, but little of which we can assume to have been designed to benefit our industry.

Current estimates of support for the proposed I/O interface by U.S.-based private industry suggest the constituencies represented by both sides effectively give the anti-I/O standard group an overwhelming 10-1 advantage.

Principle Not at Issue

Just for the record, no one is against the principle of this standard or against standards in general. Indeed, those parties in the Computer and Business Equipment Manufacturers Association (Cbema) who are most vocal in their desire to defeat the proposed standard let their position be known at the outset in such a manner as to betray their disbelief that such a standard could actually be taken seriously. It was only after their own seeming indifference resulted in their being publicly labeled "against standardization" that they started to recognize the true gravity of the situation.

Their position today against the I/O standard is based upon many factors, including the relative youth of our industry. Swamped with change, they see the proposed standard as one of a type more applicable to a traditional industry, such as steel, transportation or even chemicals, all quite describable in terms of a large body of "knowns." DP doesn't really have a history of which to speak. The time of its most vigorous, concentrated growth is *now* and over the next few years; what earthly reason could there be for hobbling it with a standard that is already obsolescent?

Annual shipments of computer systems (all types) by 1980 are expected to reach the $18 billion to $20 billion level, with minicomputer shipments growing by 25%, microcomputers growing by 40% and "traditional," general-purpose maxicomputers growing by 12% to 14% annually. Computer-related innovations are flooding the market; very large-scale integration (VLSI), bubbles and charge-coupled devices (CCD), fiber optic cables, laser and inkjet printers, etc. In fact, these innovative products and ideas have been one of the major causes of the explosive growth of the DP market, and with increasing evidence that truly monumental changes to our technological beachhead — changes that can lead to as yet untold benefits for ourselves and others — are close at hand, many serious scientists are aghast.

The principle of standardization for economy, unassailable as it is, cannot be used to rationalize a possible U.S. retreat from a leadership role to a "planet of the apes" posture. Or has the continuing shortage of computer scientists become so acute that none of the imaginative, nonpartisan ones are available to referee the matter according to the established protocol for passage of a Federal Information Processing Standard (Fips) — which standard, incidentally, the Brooks committee wantonly abridges?

Or, not to be discounted, is the committee handling "other matters" relating to interagency conflict and Office of Management and Budget (OMB) procurement policies through the use of a procedure that accidentally victimizes the computer industry?

Or is the Brooks committee visionary in its perspective?

Unfortunately, the primrose path is only seen from its terminus and I believe we may be on it now with regard to adoption of the I/O standard.

Federal Information Processing Standards (Fips) are issued by the National Bureau of Standards. The Secretary of Commerce has complete authority to impose such standards (working with NBS) under the terms of Public Law 89-307 and Executive Order 11717 (38PR12315, dated May 11, 1973). Standards imposed in this manner become effective 90 days after publication.

In any case, in addition to those arguments which are related to the youth of and accelerating waves of change in our industry, and the cries of conspiracy disguised by metaphor, the arguments against the standard's adoption as a Fips are substantial. Grouped in classes, they include those which are deeply technical, others which relate to purely commercial, competitive considerations in the U.S. and still others that focus on international competition.

Two further classifications of the same (and other) arguments center upon the maintenance of our position as the wellspring of the world's computer technology and the role of individual governments in technology in an electronic era characterized by essentially continuous, globe-enveloping communications networks. With online, local public access to computer systems whose power includes the potential for retrieval and processing of information on a global scale, we are set up to perform all kinds of mischief.

The cryogenically entombed Josephson device, with the potential of as many as 10,000 IBM 3032s in processor power, could suck a nation's economy dry in a Japanese minute by tapping into its banking systems unobserved.

Cbema's position on the proposed I/O Fips has become a matter of public record. My own point of view substantially agrees with its arguments and fully agrees with its conclusion. The government's position is also a matter of public record. An encapsulated version of both follows a bit further on.

The proposed I/O interface standard defines the functional, electrical and mechanical interface specifications for attaching computer peripheral devices through their control units to DP systems. Since a detailed technical description of the standard can be acquired from IBM or Fujitsu, it will not be given here.

Of importance to us at this time is the

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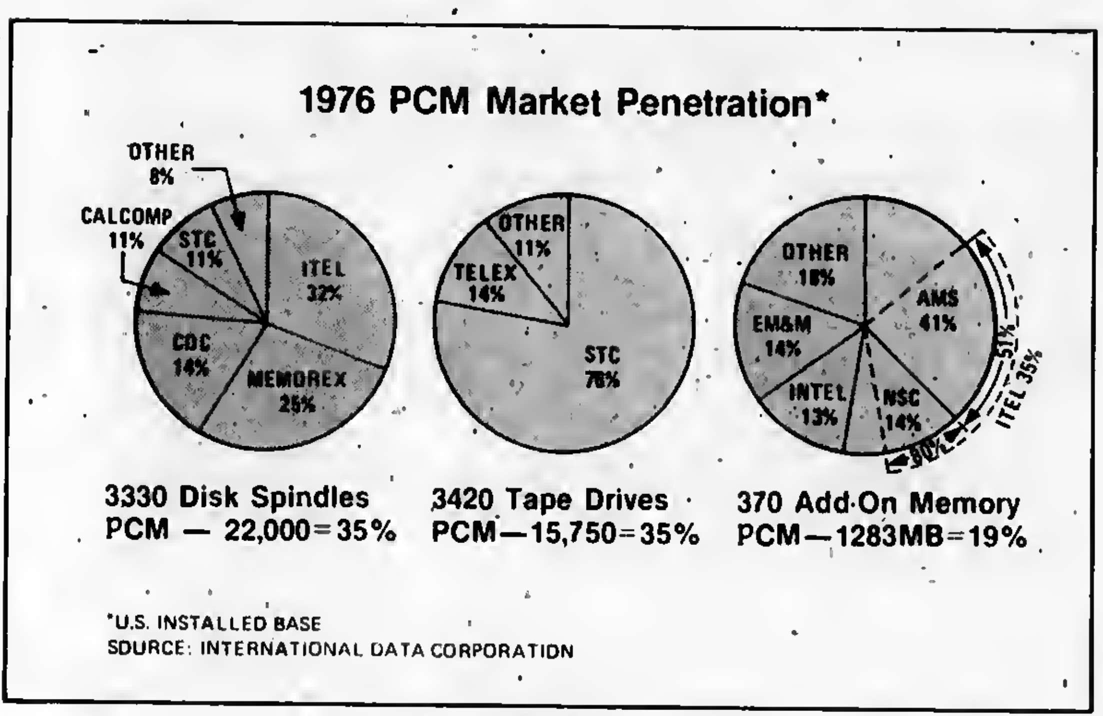
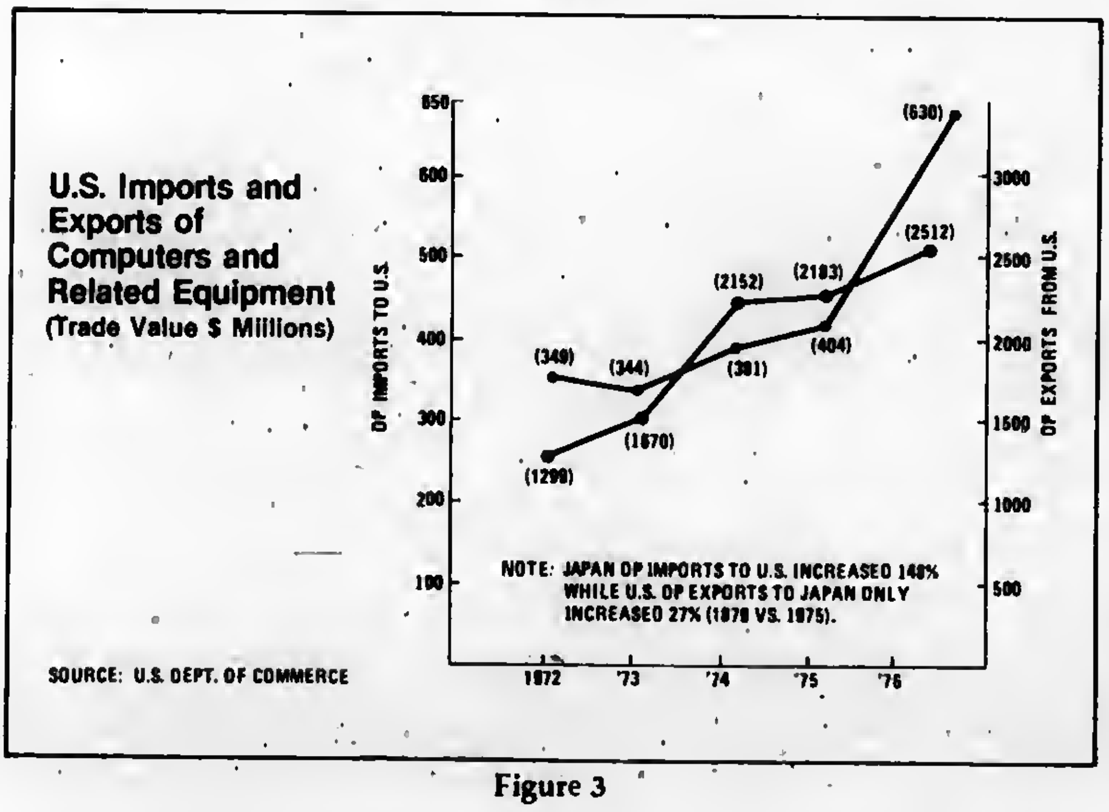


*U.S. INSTALLED BASE
SOURCE: INTERNATIONAL DATA CORPORATION

Figure 2



NOTE: JAPAN DP IMPORTS TO U.S. INCREASED 148% WHILE U.S. DP EXPORTS TO JAPAN ONLY INCREASED 27% (1976 VS. 1975).

SOURCE: U.S. DEPT. OF COMMERCE

Figure 3

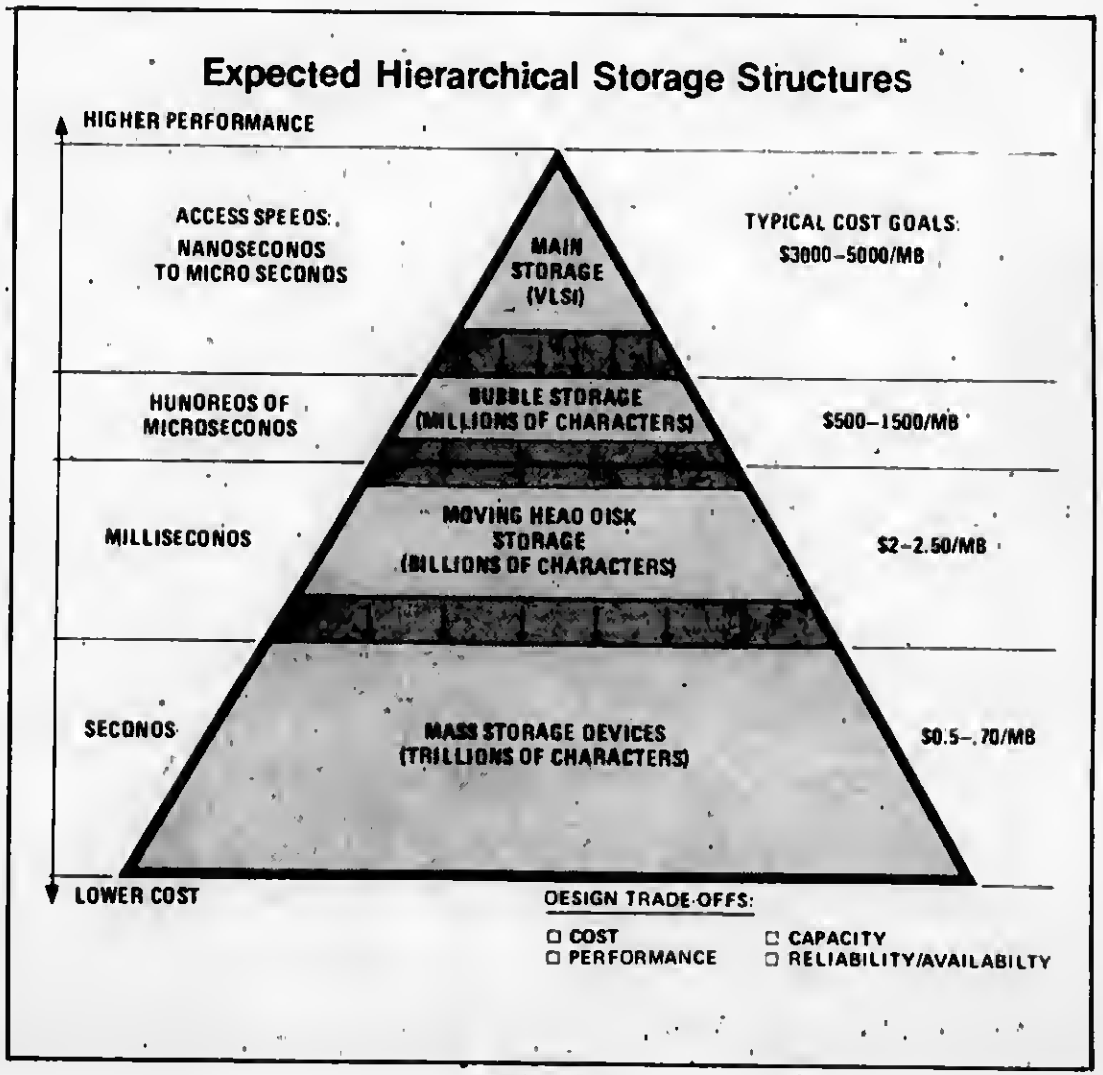

Expected Hierarchical Storage Structures
HIGHER PERFORMANCE
LOWER COST
ACCESS SPEEDS:
NANOSECONDS TO MICRO SECONDS
HUNDREDS OF MICROSECONDS
MILLISECONDS
SECONDS
MAIN STORAGE (VLSI)
BUBBLE STORAGE (MILLIONS OF CHARACTERS)
MOVING HEAD DISK STORAGE (BILLIONS OF CHARACTERS)
MASS STORAGE DEVICES (TRILLIONS OF CHARACTERS)
TYPICAL COST GOALS:
$3000–5000/MB
$500–1500/MB
$2–2.50/MB
$0.5–.70/MB
DESIGN TRADE-OFFS:
☐ COST
☐ PERFORMANCE
☐ CAPACITY
☐ RELIABILITY/AVAILABILTY

Figure 4

(Continued from Page 15)

principle. Let it suffice to say that no one views its 1.5M-byte (12M-bit) data transfer rate as visionary, given the current coaxial cable 3M-byte rates. While recent IBM announcements show an improved data transfer rate for its standard 370 I/O interface with out the use of advanced serial data transfer coaxial cable technology, this invovles yet more engineering and associated software. Supporting one mud road between city centers and Concorde-supporting airports is bad enough; two is almost too much.

The watered-down version of the standard which suggests that all computer companies bidding on federal requests for proposals carry *at least* one 360/370 I/O channel has recently been the subject of a lot of controversy, with Rep. Brooks leading the faction dissatisfied with the status quo. The committee wants more (if not all) I/O channels provided to be of the 360/370 vintage. With fiber optic I/O cable connects supporting data transfer rates of 10^{14} megabits, and with data communications bottlenecks on the brink of being overcome, one wonders whether the government's plan is to slow down our technological development and usage in some magnanimous gesture to foreign competition both within and outside the computer industry.

Crux of the Matter

The government's intent is "to minimize the cost of satisfying its data processing requirements through increasing its available alternative sources of supply for I/O peripheral subsystems, both at the time of initial system acquisition and when a system is modified through augmentation or replacement of I/O peripheral subsystems." Figure 1 shows the chronology of I/O standard developments and expected future actions.

The crux of the I/O interface issue is that the U.S. government wishes to reduce or eliminate the necessity of sole-source computer procurements. The Brooks committee claims to feel that such an I/O interface standard would increase competition and thus lower prices for all future computer peripheral requirements or upgrades.

Current I/O Interfaces

IBM	PROPOSED STANDARD (CIRCA MID-1960'S)
*AMDAHL/FUJITSU	PROPOSED STANDARD
*ITEL/HITACHI	PROPOSED STANDARD
CDC	1. PRODUCT LINE IS UNIQUE – *2. PCM SYSTEM (IBM) USES PROPOSED STANDARD
DEC	PROPRIETARY UNIOUE
NCR	PROPRIETARY UNIQUE
BURROUGHS	PROPRIETARY UNIOUE
HONEYWELL	PROPRIETARY UNIOUE
SPERRY UNIVAC	1. SERIES 90 – BYTE ORIENTED 2. 1100 SERIES – WORD UNIOUE, PLUS BYTE

*MUST REMAIN COMPATIBLE WITH IBM TO SURVIVE.

NOTE: CDC, DEC, HONEYWELL AND SPERRY UNIVAC (1100 SERIES) HAVE DIFFERENT INCOMPATIBLE CHARACTER SETS AND WORD SIZES VIS A VIS IBM/370.

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 5

One of its important concerns involves the implications of attaining peripheral device mobility in its future hardware complexes. As we know, the software development requirement to allow such interchange of peripherals is so large that it is not unreasonable to suggest that its cost alone – as yet inestimable – may offset any possible advantages to be gained by passing the Fips.

Since the standard is based on IBM 360/370 system I/O, and since IBM controls such a large segment of the world computer industry, one might be tempted to conclude that IBM's market position worldwide is replicated in its U.S. government base. In fact, it is estimated that IBM currently has only 30% of the federal government computer market, a figure which represents less than 4% of its corporate revenues. Even this share is declining.

This in itself may not be a compelling argument to negate the standard, but when viewed in conjunction with other facts it takes on additional importance. The U.S. government has traditionally been the place where innovation, if not subsidized, was at least encouraged. Univac, HIS and the rest of the "incompatibles" (in the proposed I/O standard sense) command fairly large segments of the federal marketplace. As we noted earlier, none of these produce large processors with the proposed I/O interface. In fact, much of the I/O interface design implemented on their systems was heavily affected by earlier, government decisions specifying what government wanted these companies to support.

Now, it seems fair to ask why one branch of the U.S. government encourages more IBM compatibility, while another branch — the Justice Department — sues IBM for allegedly monopolistic practices.

Then, in view of the fact that many Japanese manufacturers are IBM plug-compatible, how can the U.S. government complain about Japanese electronics dumping and unfair competition while at the same time encouraging Japanese plug-compatible imports via the proposed standard?

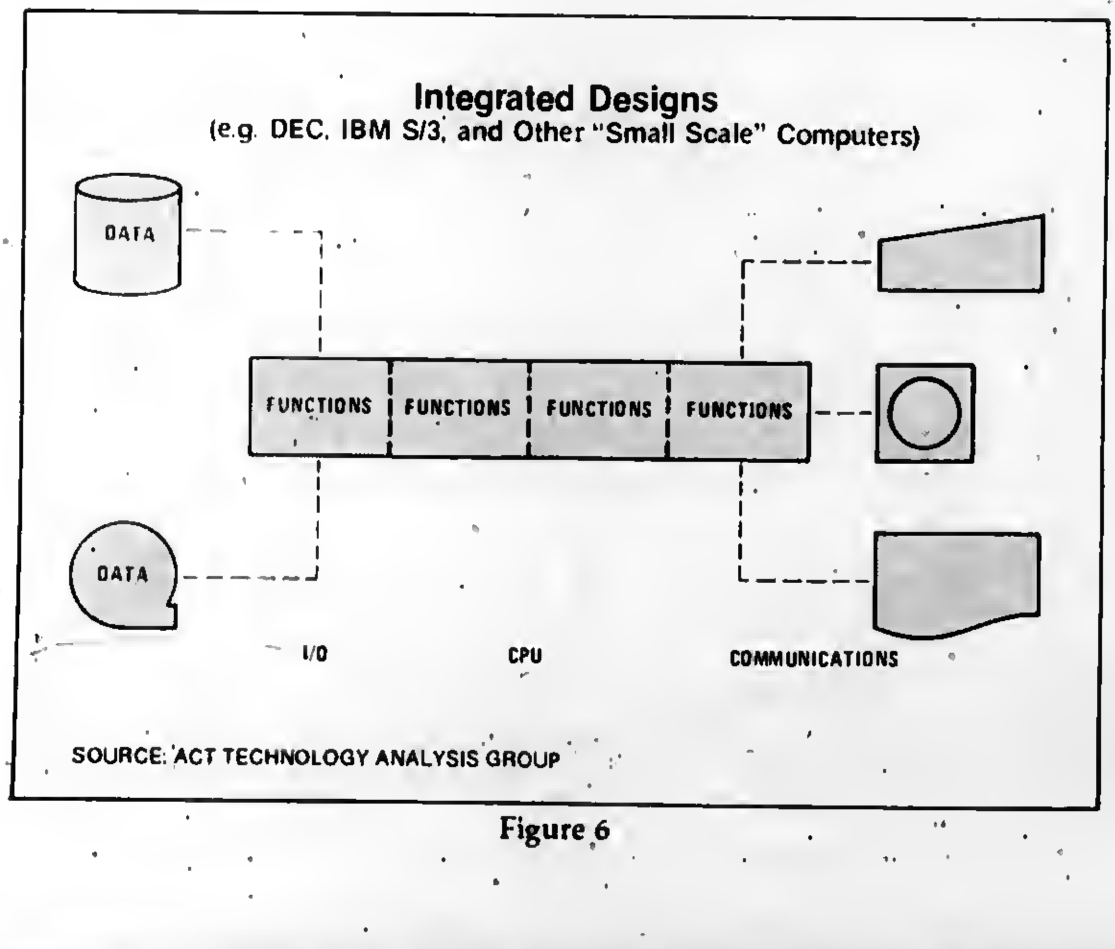
Looking at the Arguments

Let us summarize some of the political, technological and economic arguments for and against the proposed I/O interface standard. We will do this in the following form: testimony by A.G.W. Biddle, president of the Computer & Communications Industry Association (CCIA), before the Senate Antitrust Monopoly Subcommittee appears in italics; remarks which represent Cbema's position will follow. The CCIA and Cbema positions are assumed to reflect those of the House committee and the majority of our industry, respectively.

1. *The absence of standards can serve as an anticompetitive barrier to market entry.*

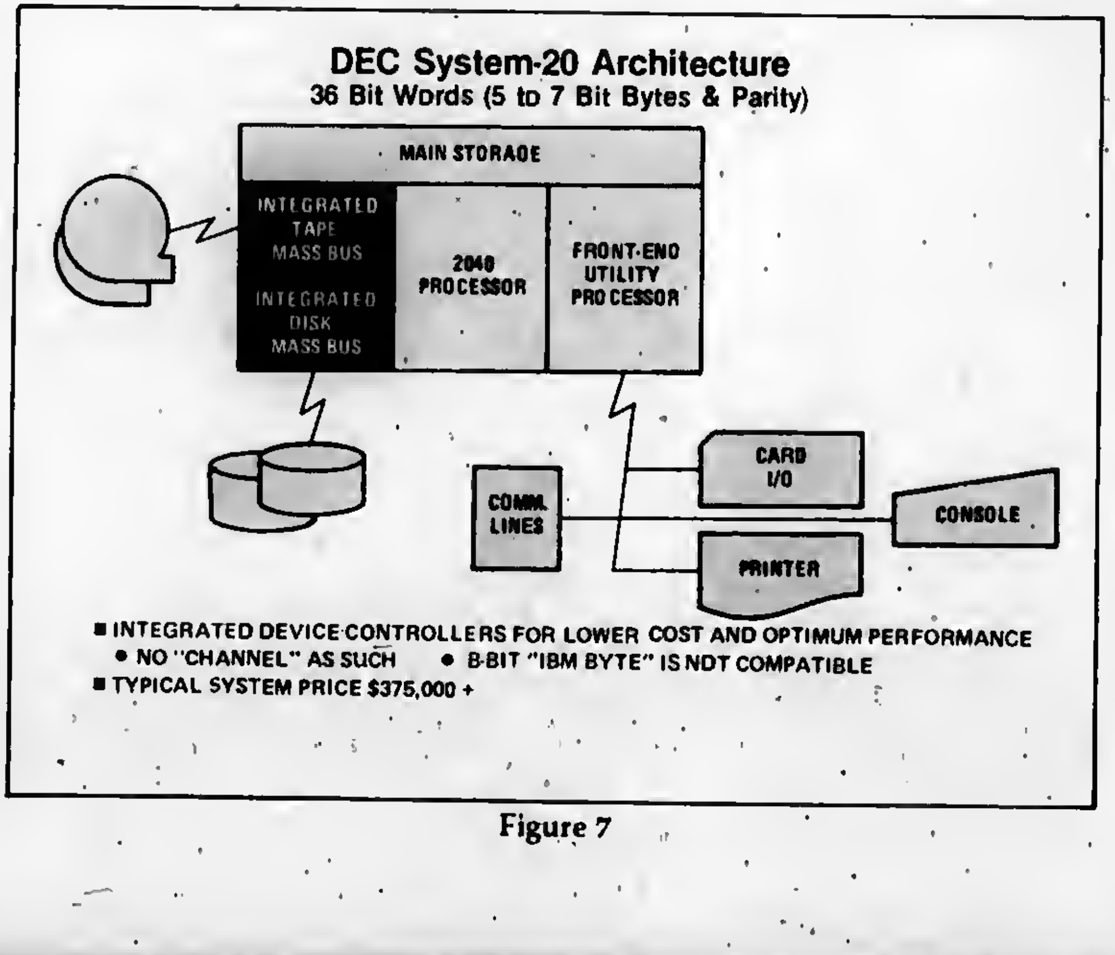
Since this remark is equally true and false, little can be gained from it. If Biddle means he can observe anticompetitive barriers arising and this is attributable to the absence of standards, evidence also exists to support a contrary view.

Many new firms have entered and are continuing to enter the dynamic DP industry each year. The Systems '77 conference recently held in Munich contained acres of hardware from all over Europe primarily (but from elsewhere, too). While most processors


Integrated Designs
(e.g. DEC, IBM S/3, and Other "Small Scale" Computers)

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 6


DEC System-20 Architecture
36 Bit Words (5 to 7 Bit Bytes & Parity)

■ INTEGRATED DEVICE CONTROLLERS FOR LOWER COST AND OPTIMUM PERFORMANCE
● NO "CHANNEL" AS SUCH ● B-BIT "IBM BYTE" IS NDT COMPATIBLE
■ TYPICAL SYSTEM PRICE $375,000 +

Figure 7

COMPUTERWORLD

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☐ Home

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PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

- **10** Manufacturer of Computer or DP Hardware/Peripherals
- **20** Manufacturer (other)
- **30** DP Service Bureau/Software/Planning/Consulting
- **40** Public Utility/Communication Systems/Transportation
- **50** Wholesale/Retail Trade
- **60** Finance/Insurance/Real Estate
- **70** Mining/Construction/Petroleum/Refining
- **75** Business Service (except DP)
- **80** Education/Medicine/Law
- **85** Government - Federal/State/Local
- **90** Printing/Publishing/Other Communication Service
- **95** Other: ______________________

TITLE/OCCUPATION/FUNCTION

- **11** President/Owner/Partner/General Manager
- **12** VP/Assistant VP
- **13** Treasurer/Controller/Finance Officer
- **21** Director/Manager of Operation/Planning/Administrative Service
- **22** Director/Manager/Supervisor DP
- **23** Systems Manager/Systems Analyst
- **31** Manager/Supervisor Programming
- **32** Programmer/Methods Analyst
- **41** Application Engineer
- **42** Other Engineering
- **51** Mfg Sales Representative
- **52** Other Sales/Marketing
- **60** Consultant
- **70** Lawyer/Accountant
- **80** Librarian/Educator/Student
- **90** Other: ______________________

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Detach here, fold, and place in post-paid envelope attached through binding.

there were in the mini category, I/O channels, controllers, devices, cables and protocols varied all over the lot.

Since IBM is said to control an estimated 60% to 65% of the worldwide market, an I/O standard could bring commensurate benefit to the industry leader, while hurting the smaller mainframe companies. The smaller firms would be forced to develop, support and maintain "IBM-compatible" I/O hardware and software on all major systems.

Furthermore, with the swift decline of our processor costs occurring at a rate roughly equivalent to the rate of growth of the minicomputer industry, some of our large mainframe manufacturers may be in more precarious positions than either we or they expect. IBM's need to fuel its growth with about two billion additional dollars per year in order to fulfill its corporate plan is no simple challenge to its management, given an environment in which cost and pricing formulas are changing before its very eyes.

Bright, new, innovative ideas are absolutely essential or the plans of all the large mainframers may be threatened by the marketplace confusion. It is no wonder that IBM is unwilling to reveal its I/O interface plans for the 1980s to anyone outside IBM.

Value-added communications, software, processors, channels, etc. will be the name of the game for survival. And one area that's been begging for improvement for a long time is the I/O interface.

2. *A supplier (or suppliers) which seeks to lock in its customers opposes the development of standards which facilitate product (or subsystem) interchangeability.*

This assertion, too, is as true as it is false. Customers become locked in a supplier at many levels and for various reasons: long-term financial commitments (three- to five-year leases or purchase and/or purchase options), software lock-in (operating systems, data base, data communications, languages, etc.) people lock-in (the cost and time element involved in retraining a large staff on another vendor's equipment can be prohibitive), and so forth.

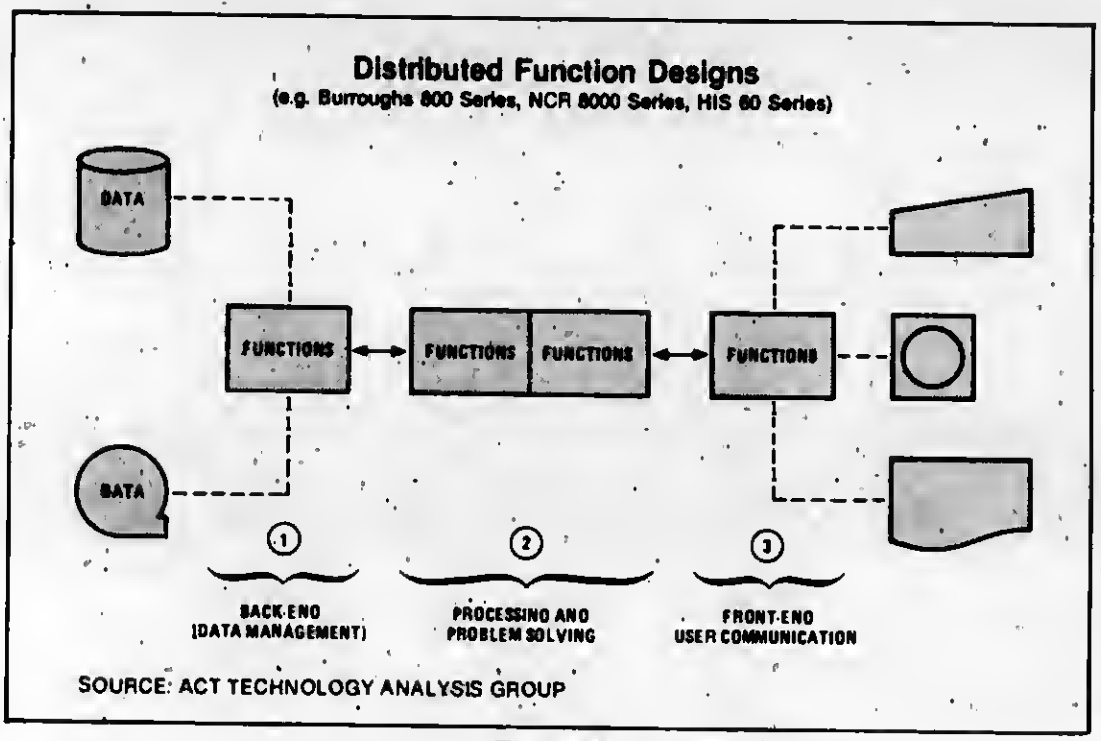

Distributed Function Designs
(e.g. Burroughs 800 Series, NCR 8000 Series, HIS 60 Series)
DATA
DATA
FUNCTIONS
FUNCTIONS
FUNCTIONS
FUNCTIONS
①
②
③
BACK-END (DATA MANAGEMENT)
PROCESSING AND PROBLEM SOLVING
FRONT-END USER COMMUNICATION
SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 8

Moreover, creation of an I/O interface standard would *not* in itself facilitate product (or subsystem) interchangeability because of mainframe software/firmware differences, data format uniqueness (disks, diskettes) and device control logic incompatibilities. Applications maintenance activities would soar as programmer/analysts went back into their vast applications libraries to alter programs to accrue short-term hardware interchangeability improvements.

Occurring against the backdrop of swift innovation in devices, communications, etc., this could raise havoc. It also seems clear that the proposed IBM I/O-compatible standard would tend to further lock users in to IBM.

3. *Lacking substantial economical motivation through customer refusal to purchase nonstandard products, there is little incentive for producers to develop meaningful standards.*

This is completely false. The reverse situation currently prevails in the marketplace — customers demand standard compatible products (when upgrading or considering alternate products) or substantial performance/cost/function benefits to do otherwise.

From one perspective, therein lies the heart of the whole affair. Trade-off analyses which pit the ideas of bringing in new gear against extending usage of the old are routinely made by all DP managements, which would really like to continue to have a choice. The user management population is becoming increasingly sophisticated in estimating conversion costs, new facilities requirements, etc.

An I/O interface standard would force all firms that wish to remain in the federal government market to adapt to IBM specifications. Those whose product plans for the 1980s have already been launched would incur thereby a substantial cost penalty.

The smaller computer firms would be impacted the most, since the cost to adapt would represent a higher percentge of their total product cost.

4. *There is no institutional mechanism to encourage private sector voluntary standards bodies to act in any but their own self-interest.*

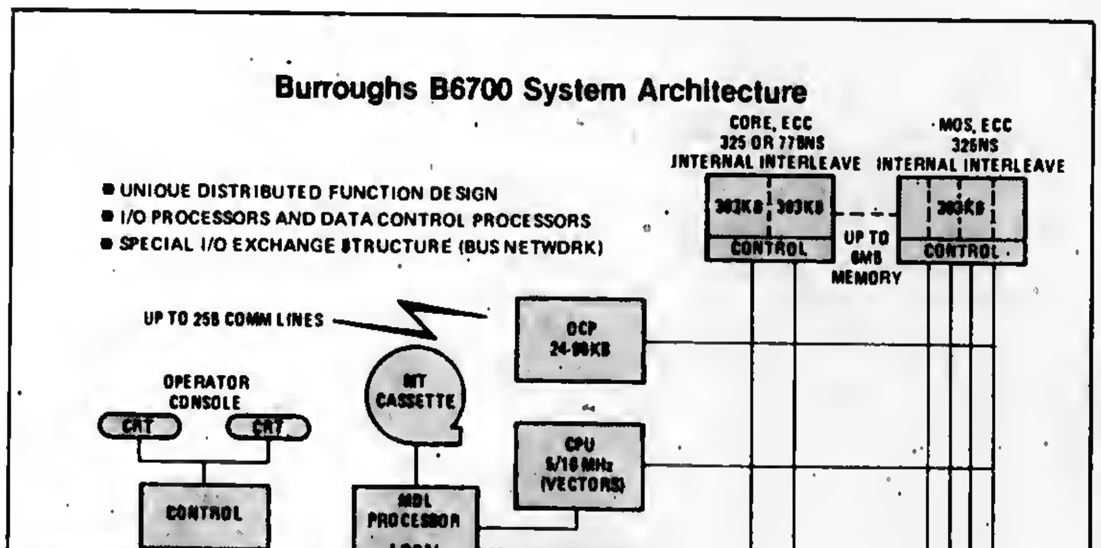
The natural competitive forces which exist have *already* caused various standards to be considered and created; e.g., Ansi 74 Cobol, a pending communications standard (X.25), a pending Codasyl data base standard, card I/O, magnetic tapes and many more (Micr, Ascii, etc.).

Furthermore, large user groups such as Guide, Share, National Retailers Association, the Association for Computing Machinery (ACM), Association of Data Processing Service Organizations (Adapso), etc., *have* the power to demand standards. The first two are against the standard, citing obsolescence as a major concern.

5. *In technology-based industries, consumer or general interest participants lack the necessary technical expertise to contribute. They have little choice but to take on faith the representations made by the suppliers' representatives.*

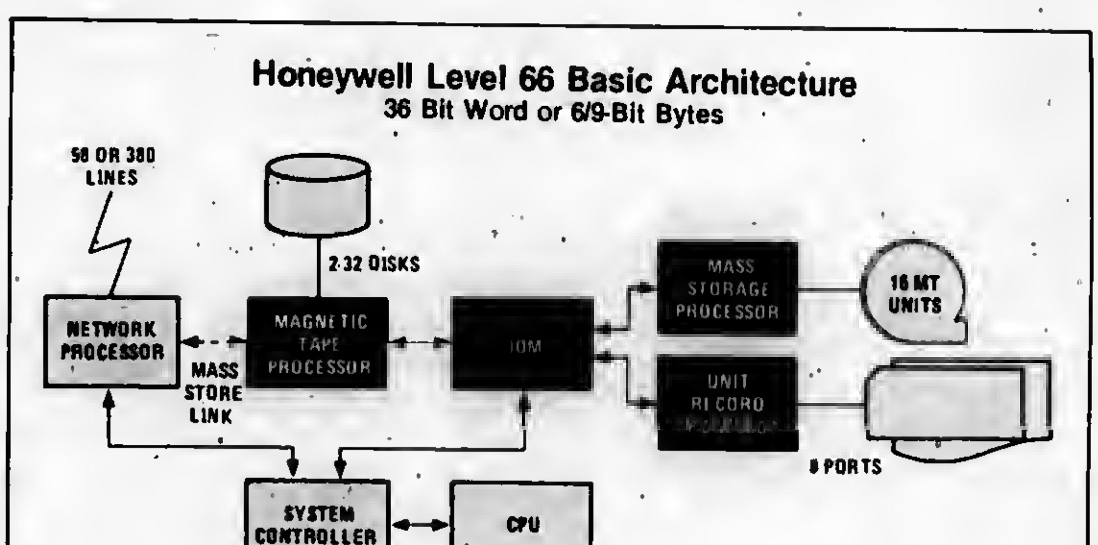
First, the DP business is *not*, by and large, a consumer-oriented one, such as those involved in the manufacture of TVs, washing machines or calculators, so the issue raised by this criticism is not altogether germane.

(Continued on Page 18)


Burroughs B6700 System Architecture
- UNIQUE DISTRIBUTED FUNCTION DESIGN
- I/O PROCESSORS AND DATA CONTROL PROCESSORS
- SPECIAL I/O EXCHANGE STRUCTURE (BUS NETWORK)
- SIX PROCESSORS: CPU'S + IOP'S + DCP'S
- DCP'S CAN INTERFACE VIA IOP'S (FOUR DCP'S/IOP)

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 9


Honeywell Level 66 Basic Architecture
36 Bit Word or 6/9-Bit Bytes
- DISTRIBUTED FUNCTION DESIGN
- UNIQUE I/O DEVICE PROCESSORS
- DEVICE DEPENDENT I/O ATTACHMENT
- DIRECT MASS STORAGE LINK AND DIRECT MEMORY INTERFACE (VIA SYSTEM CONTROLLER)

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 10

TSUNAMI IN DEPTH

(Continued from Page 17)

Second, many users today have lived through two or three generations of DP equipment, and as a result they are *very* experienced in both the technical and economic factors involved in their usage. The first-time mini systems users may be a concern (strangely, those systems were excluded from the standards coverage until recently). However, most are recipients of dedicated systems prepared by OEMs of mini systems (e.g., software houses) or else have access to software houses for help in all aspects of their work.

Remember, hardware is declining at a rapid rate as a percentage of the total DP environmental mix. And our country's DP services business is being entered in increasing numbers by the large mainframers to support their cash income requirements as their hardware assets implode in value.

In this CCIA argument, some merit does exist. However, implicit in a concept of the future which envisions proliferation of systems throughout our society and in every area of endeavor, and which also makes no more demands of users in the area of technological know-how than is required of car owners today, is a need to recognize that slowing down the innovative process will *not* help to make that vision a reality.

The kinds of systems we have already require substantial expertise. Eliminating this requirement involves (among other things) altering current systems architectures to facilitate access to data being processed by the power we have available. The proposed I/O standard drastically limits the possibility of realizing this goal.

6. *In a high-technology industry, the voluntary standards-making process lags behind the technology because of the inordinate time required to reach a consensus.*

On the contrary, a high-technology, high-growth industry such as DP naturaly has fewer standards precisely because of its high growth rate and fluidity. It is expanding at a rapid pace. Premature standards limit innovation.

However, even if we accept this assertion, the solution to the problem it poses rests more in speeding up the time to consensus rather than in slowing down the technology.

7. *Industry participants resist the development of anticipatory standards for fear that such standards will restrict their available design options and may serve to disclose their product or marketing strategies.*

Unnecessary standards based on obsolescent technololgy can/will seriously affect design trade-off options and may *add* substantially to overall product design, manufacturing and support costs.

But, as obvious as this assertion is, it does not address the main issue at all. You would have to be extremely unobservant not to notice that a literal blizzard of technological change in the computer industry has been taking place.

8, *We do not, however, have standard higher level computer languages that permit a program written for one machine to be run without change on another's machine, nor standards for efficient high speed usage of computer/communications networks . . .*

Standard langauges do exist, such as Ansi '74 Cobol, Fortran and RPG-II (either official or so-called "de facto" standards). If we take the above assertion literally, it is absolutely incorrect.

It is true, however, that more often than not some changes are required; e.g., the user must recompile the program and/or make some modifications to job control steps.

This is essential since different computers have unique architectures (word size, instructions types, data formats, etc.). These differ for good and practical reasons too lengthy to debate here.

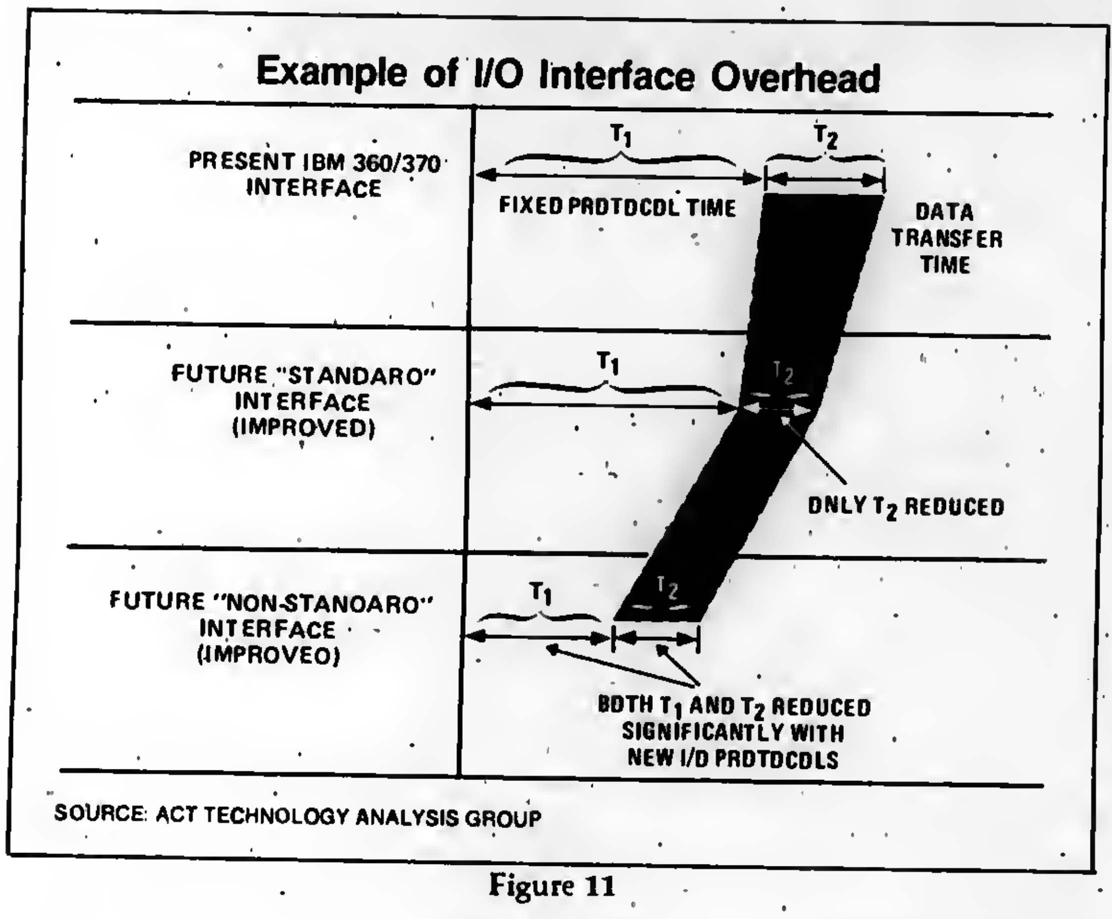
It would be unthinkable that we require all manufacturers to produce the same system. Moreover, such relatively minor changes can improve the applications performance significantly.

Today, all major manufacturers are collectively spending hundreds of millions of dollars to develop and support "standard" languges for different models or series of computers. Every new model is conceived as requiring that it fully support such standard languages if it is to be competitive and marketable.

This is a concept with which I disagree. It has been promoted by a seemingly unconscious dedication to continued proliferation of the programming tools of the early days such as Cobol, RPG and Basic and some new ones like PL/I. These will all soon fade away with only Fortran or Fortran-like facilities surviving because of their relationship to algebra as it is taught in our schools.

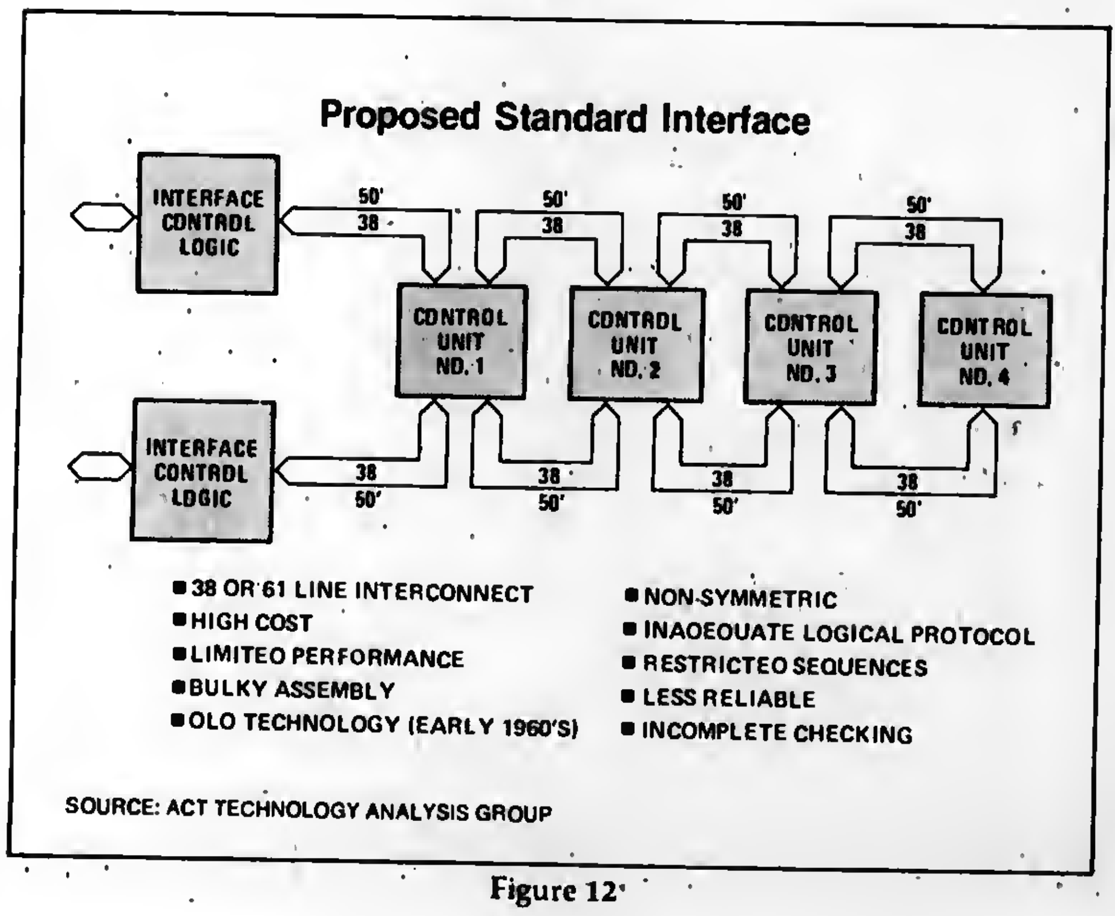
Higher level language standards would not by themselves solve the program compatibility or portability issue. Data base and data communications incompatibilities are far more complex and vital to this issue.

Standards for communications networks are currently under active consideration. Clearly, it would have been premature to impose communications standards on the industry prior to such recent technological developments as satellites, microprocessors or digital


Example of I/O Interface Overhead
PRESENT IBM 360/370 INTERFACE
T1
T2
FIXED PROTOCOL TIME
DATA TRANSFER TIME
FUTURE "STANDARD" INTERFACE (IMPROVED)
T1
T2
ONLY T2 REDUCED
FUTURE "NON-STANDARD" INTERFACE (IMPROVED)
T1
T2
BOTH T1 AND T2 REDUCED SIGNIFICANTLY WITH NEW I/O PROTOCOLS

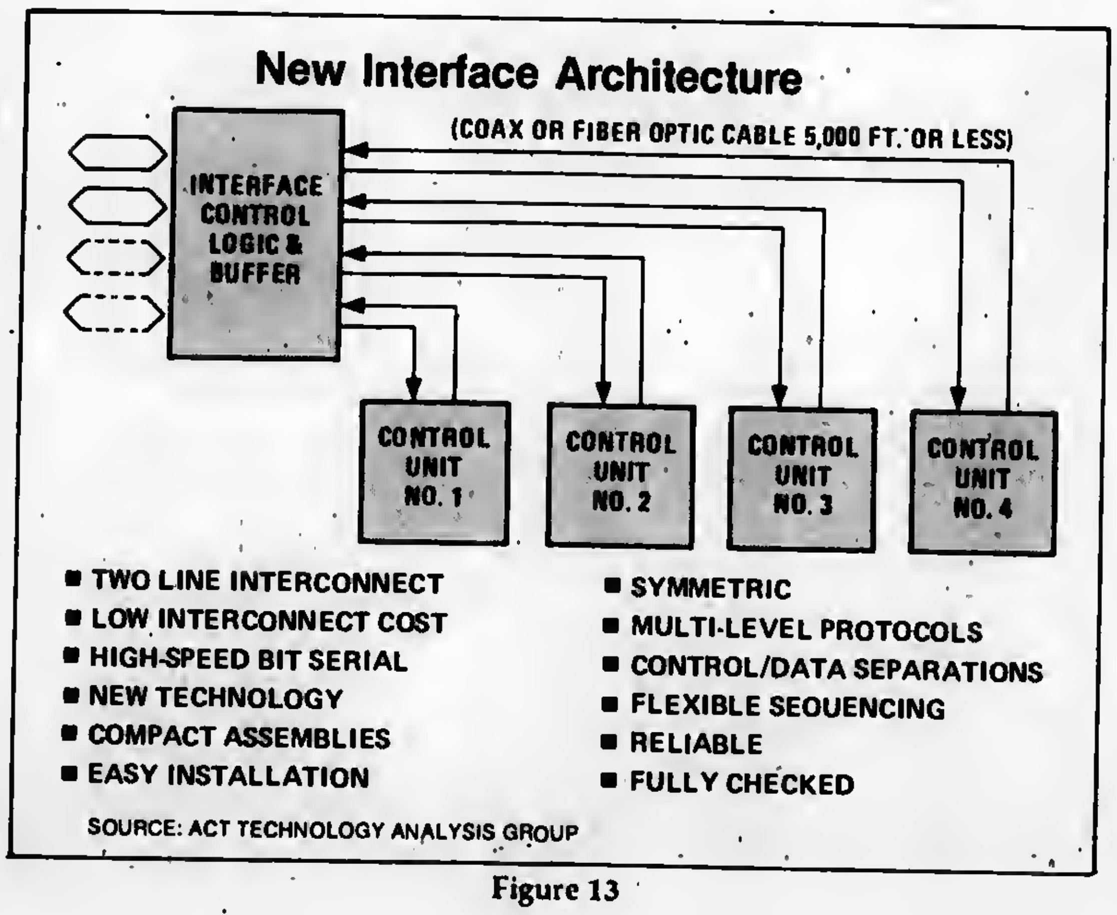
SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 11



SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 12



SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 13

links.

Indeed, with AT&T faced with a possible $30 billion write-off from equipment obsolescense and the corporation in a period of intense reassessment of its future options to fulfill its charter, we should pause to reflect on the meaning of physical standards.

While sustaining Justice Department inquiries and engaged in conflicts caused by sudden, large encroachments on its heretofore inviolate territory, one cannot help but conclude that AT&T is faced with the following, unanticipated phenomenon. As the waves of technological change increase in frequency along with a product cost plunge, decelerating the time periods of technological obsolescence, we suddenly find that driving the whole affair of production is *not* marketplace need, but force-feeding of technology to remain competitive.

Standards enactment could serve to slow this process to bring it in line with marketplace need, but other measures are better. With the marketplace expanding (and everywhere), stimulated by labor problems abroad as well as by a wider selection of product acquisition options, it seems a wanton act to slow down our computer industry to achieve this effect — if it is occurring.

9. *Lack of computer industry standards costs the taxpayer hundreds of millions of wasted dollars per year.*

Quantifying the amounts gained or lost by this requires the use of black art. In fact, premature, ill-considered standards based on obsolescent designs can cost hundreds of millions of dollars by seriously restricting technological progress in this fast-changing industry.

While lack of I/O standards *may* have cost the taxpayer million of dollars over the *past* 10 years, the imposition of an obsolescent standard at this date would be of questionable future cost savings to the taxpayer.

10. *Those seeking adoption of the proposed Fips (PCM firms principally) point out there is no evidence of any significant technological development taking place in the I/O interface area.*

Future I/O storage subsystems (which should be introduced in or before 1980) will require a "hierarchical structure" where data automatically percolates upward/downward, from/to slower, less costly devices (e.g., magnetic cartridges or other media) to faster, intermediate and moderately priced devices (disks) and then to more expensive, very fast devices (CCDs or bubbles) using fiber optic cables and microprogrammed controllers (microprocessors).

This staging arrangement will require careful design trade-offs and highly integrated packaging to ensure cost-effectiveness for the customer in terms of speed, capacity, reliability, flexibility (growth) and cost. Premature I/O interface standards could seriously impact these planned innovative, progressive ideas, to the detriment of the user.

11. *To contend that its adoption will stifle progress is also a red herring. Its adoption serves to put the I/O channel on the table for all to see and work with (PCMs). Also, standards can be modified in accordance with advances in technology.*

It is unreasonable to ask the major computer manufacturers, which have collectively spent hundreds of millions of dollars on developing I/O hardware, system control software and firmware, to give the PCMs their plans, drawings, specs, etc. And, according to the government's requirements, if the Fips were passed, it would require that future product designs needed to bid on federal procurements be revealed.

It just doesn't make good sense to reveal innovative product designs to foreign competition, not to speak of competition at home, before they are ready for announcement and production.

Typically, it takes five to six years to develop a major, new, advanced technology computer line. Many manufacturers, therefore, are already committed to designs which may be introduced by 1980. To require that these designs be altered at this late date would create an enormous, unfair burden on the firms involved.

In addition, the modification of the proposed I/O standard to adapt to newer architectures and technological improvements is not practical, since such change would necessarily trail hadware/software development by at least as many years as Biddle suggests voluntary standards enactment may take.

12. *The opponents contend that the implementation of the I/O channel will be excessively costly to both manufacturers and users. Studies by the National Bureau of Standards indicate the standard can be implemented on existing CPUs at a cost of $7,000 to $40,000 each, using black box adapters.*

While the hardware "black box adapters" may represent a relatively small cost increase for some manufacturers, the software change and support costs required to achieve actual I/O compatibility for operating applications seem an incredibly high price to pay. Needless to say, it will significantly affect final user price.

In addition, the final purchase price must reflect hardware manufacturing cost, software and support cost, main-

(Continued on Page 20)

Interface Comparison

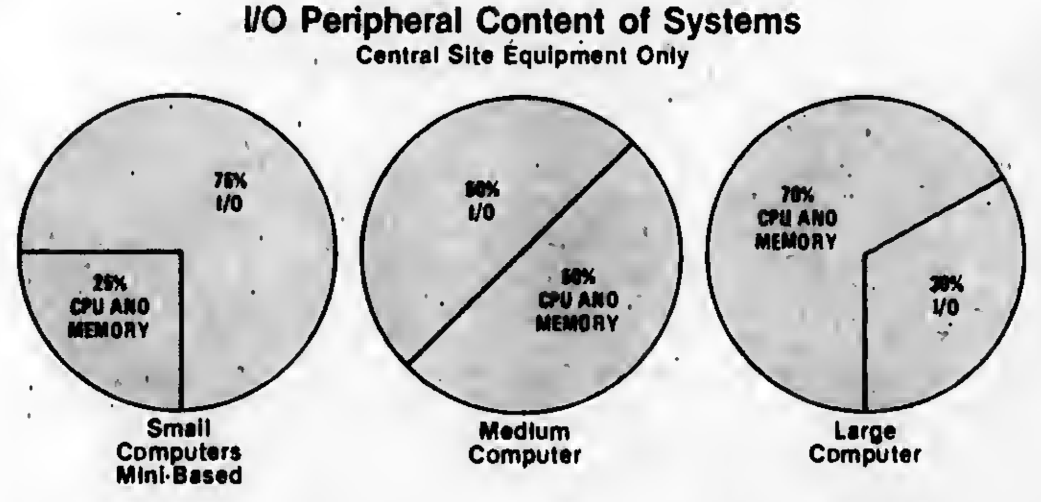
	PROPOSEO STANOARD	CURRENT NEW TECHNIOUES
CHARACTERISTICS	PARALLEL INTERFACE	SERIAL INTERFACE
PERFORMANCE	1.0	2 X OR GREATER
CABLE LENGTH LIMIT	*200 FT. OR LESS	400 FT. TO 5000 FT.
NO. OF LINES (WIRES)	38	2
	61 (OUAL BYTE)	4
SPACE REDUCTION	—	X20
COST REDUCTION	—	75% OR MORE
RELIABILITY	—	X2 OR BETTER
TECHNOLOGY	OLD	NEW
CHECKING	PARTIAL	FULL
SYMMETRY	NO	YES
PROTOCOLS	**RESTRICTIVE	FLEXIBLE

*ESTIMATEO 55% BANDWIDTH LOSS AT 200 FT

**E.G., SOFTWARE CHANNEL COMMAND STRUCTURE (COMMAND CHAINING REOUIREMENT) CAUSES AN ESTIMATED 50% LOSS IN CHANNEL THROUGHPUT

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

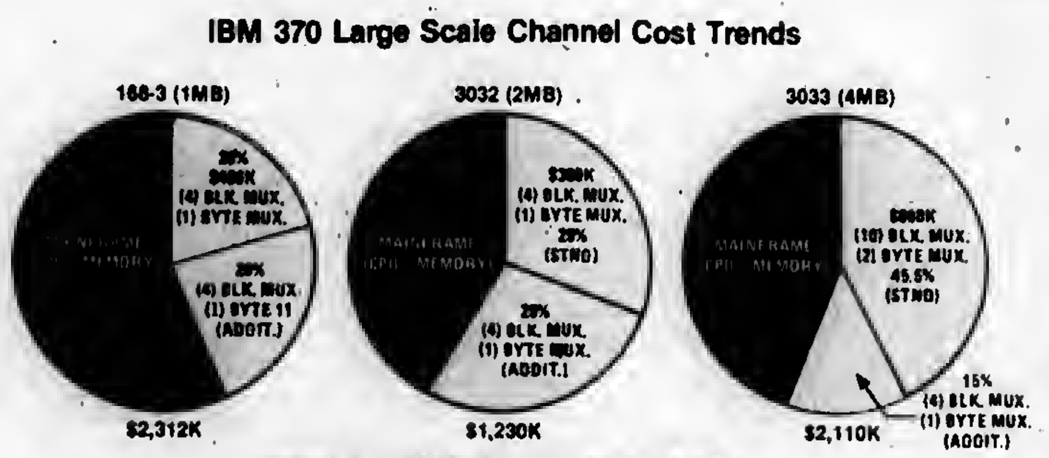
Figure 14



SOURCE: OATA OUEST, INC.

SOURCE: ACT ESTIMATES BASEO ON CONFIGURATION ANALYSIS

Figure 15



MINIMUM MAINFRAME PRICE EXCLUDING CHANNELS (CPU, BUFFER STORAGE AND STANOARD FEATURES ONLY)

CONCLUSION:

(1) CHANNEL (SETS) COSTS ARE TRENDING UPWARO AS A PERCENT OF MAINFRAME COST

(2) NON-IBM COMPATIBLE COMPUTER MFG'S CANNOT AFFORD TO ADD 20% TO 29% (OR MORE) TO MAINFRAME COSTS TO FULLY IMPLEMENT THE PROPOSED STANDARD

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 16

(Continued from Page 19)

tenance, overhead and profit, and it will present a large percentage of final system price depending on the size of the computer and number of "black boxes" required.

The adoption of this I/O interface standard may force most computer manufacturers to unbundle the channel logic and software handler development support cost — thus cancelling out any potential saving.

Finally, where does one draw the line — while $7,000 to $40,000 plus all the above "other" costs may (although I doubt it) be acceptable at the "high end" of the computer spectrum (IBM/370/168 or 3033 or equivalent competitor models), this extra cost may mean the difference between product profit or loss at the "low end."

13. *The CCIA proposed an addition to Section 102(b) 2 of the bill: "Where two or more units, devices or subsystems are functionally or physically separate and distinguishable one from the other, but must be joined together or interconnected to perform their intended function, and alternative sources of supply exist, or in all probability will exist, standards for the proper and efficient interconnection of the device shall be provided ... Interconnecting standards will define the physical, mechanical, electrical, optical, or other conditions necessary to ensure the efficient, safe, and workable interconnection of the units devices or subsystems."*

This totally ignores the software issues: (1) Interconnection without firmware (microcode logic) or software compatibility is useless; (2) Firmware/software device control handlers are part of the operating system and *must* be developed, supported and *protected* by the computer manufacturer:

- To avoid data security breaches.
- To insure proper operations and reliability/maintainability.
- To maintain optimum performance.
- To provide future compatible growth to newer, more advanced (cost-effective) products.

And we now come to perhaps the most disturbing of all issues. It strikes at the very heart of the matter when considered outside the domain of the arguments pro and con cited above.

The very concepts of "component" or "subsystem," even of I/O itself, are dramatically changed and still changing. Some I/O functions are moving outbound (timing clocks, buffers, logic), while other functions are being integrated within the central electronics complex or CPU. Some channel computers or computers contained in intelligent controllers are becoming increasingly powerful to the point where they challenge the capability heretofore reserved to the host computer systems of the middle to large ranges.

Interconnection and interface will become more a matter of convention and principle of manipulating physical entities. Indeed, when the next generation of computer systems is introduced by 1979-80, one may legitimately ask where the "mainframe" (or CPU) is.

The mainframe logic/arithmetic and control circuits (function) will have been distributed within the central electronic complex and/or network in order to improve performance, function, cost, reliability and security.

The PCMs have been doing well lately as the market penetration chart in Figure 2 indicates. We would be remiss in not noting that part of their success may be traced to their "free ride" on the system software of mainframers with whose products their own products connect, thereby releasing them from the obligation of funding heavy software development.

Moreover, many PCM firms import peripheral or computer-related components or subassemblies from Japanese manufacturers which enjoy the benefits of a relatively cheap labor force and are substantially subsidized by the Japanese government.

In fact, Japanese imports to the U.S. have increased 148% between 1975 and 1976 (see Figure 3). And now it appears that the U.S. government is prepared, perhaps without fully understanding the implications of the course upon which it has embarked, to stimulate yet greater foreign imports by effectively forcing the subsidizing of PCM activity via the proposed I/O interface standard.

In addition, this would appear to cause an underwriting of Japanese OEM and PCM activity by compelling all the computer manufacturers to pro-

Large Scale System Scenario

	FEATURES	CURRENT COSTS W/O STND	CURRENT COSTS WITH STND	1980 COSTS W/O STND	1980 COSTS WITH STND
A.	MAINFRAME COMPLEX (CPU, MEMORY, POWER)	.45	.50	.25	.27
B.	I/O CHANNEL SETS	.20	.20	.15	.15
C.	I/O INTERFACE STND (EST. ADDIT. COST)	–	.10	–	.10
D.	I/O SUBSYSTEMS (LOCAL EQPT. ONLY)	.35	.15	.25	.10
E.	I/O SUBSYSTEMS (PCM DISCOUNTED)	–	.15	–	.10
	HARDWARE TOTAL	1.00	1.10	0.65	0.72
F.	MAINTENANCE CHARGES	.12	.12	.14	.16
G.	CURRENT SYST. SOFTWARE	.05	.05	–	.05
H.	NEW SYST. SOFTWARE	–	–	.10	.10
	TOTAL COSTS	1.17	1.27	0.89	1.03
	EXPECTED PERFORMANCE	1.0	LESS?	2.0-3.0	DEGRADED SIGNIFICANTLY

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 17

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Proposed I/O Interface Standard — Summary and Conclusions

- OBSOLESCENT TECHNOLOGY AND ARCHITECTURE
- ANTI-COMPETITIVE FOR SMALLER FIRMS
- COSTLY TO DEVELOP AND MAINTAIN
- SERIOUSLY LIMITS SYSTEM PERFORMANCE
- INFLEXIBLE DEVICE SHARING
- INHIBITS INNOVATION
- COULD AFFECT U.S. LEADERSHIP AND EXPORTS
- MAY INCREASE FOREIGN (JAPANESE) IMPORTS
- INADEQUATE RELIABILITY
- UNNECESSARY — ALTERNATIVES EXIST
- DENIES FEDERAL GOVERNMENT FUTURE I/O TECHNOLOGY BENEFITS
- QUESTIONABLE COST-EFFECTIVENESS:
  - APPLICATIONS SOFTWARE IMPACT?
  - SYSTEMS SOFTWARE IMPACT?
  - HARDWARE VS. UNBUNDLED COSTS?
  - GOVERNMENT INSTALLED BASE PROFILE?
  - SHORT VS. LONG RANGE IMPACT?

SOURCE: ACT TECHNOLOGY ANALYSIS GROUP

Figure 18

vide one to four already Japanese-compatible I/O channels and interfaces as well, thus adding cost to U.S. manufactured computer systems while lowering costs for domestic and foreign PCM firms.

Leaving the business competition and economics arenas, let's examine a few technical factors:

• Computer memory cost improvements have been most impressive in the past and will be even greater during the next few years. CCD devices with 65K-bit densities are already in production today, and 262K-bit chips are expected by 1980. Disk recording densities have improved significantly from less than 5M-character capacities in the early '60s to over 500M-characters today. These are expected to double again by 1979.

These credible technological innovations and improvements will require not only higher speed channels, but also new architectural approaches (as shown in Figure 4). The proposed I/O standards *cannot* effectively handle these new devices, higher data rates and more efficient I/O structures (see Figure 5).

• "Small" computers usually have *integrated* designs to optimize performance at the lowest cost. Thus, backend I/O functions and front-end communications functions time-share the basic CPU logic, buffers, etc.

In contrast, "large" computers must optimize for highest performance; therefore, the backend and front-end functions are *distributed* to off-load the CPU (see DEC, Honeywell and Burroughs computer system examples).

"Medium-scale" computers typically represent compromise designs or a partly distributed design trade-off. Each manufacturer must be free to optimize and explore new approaches.

Government interposition of an inhibiting standard which would be costly to implement and support, reduce performance and increase system and operational complexity seems strange at this time. Note in Figures 6-10 that many vendors also have character sets or word sizes which are incompatible with the 8-bit byte; the software/hardware overhead associated with handling this "foreign" byte structure is very high.

Furthermore, how would the proposed I/O interface work in a distributed network of computers or nodal processors — some of which do not need I/O peripherals or only limited, special I/O devices? Does it make sense to force this interface (and its related cost) on all future processors?

• The block multiplexer, byte multiplexer and selecter channels implied by the standard are obsolescent when evaluated in the following terms:

1. Protocol overhead (request/-acknowledge/byte transfer/etc. sequence) *fundamentally* limits the bandwidth of the channel. Future high-density disks and CCDs could not attach to this early 1960s "plug" without significant performance penalties (see Figure 11).
2. I/O software path lengths could increase up to sixfold, thus reducing performance and needlessly consuming additional main storage.
3. Duplicate sets of channels (the primary and proposed standard) would be inflexible and restrictive in that separate I/O subsystems would be required, with the added problem of system load balancing.
4. The proposed standard is bit parallel, half-duplex (38 lines or more), less reliable and more costly vs. more advanced serial I/O interfaces (see Figures 12 and 13).
5. Computers which have other than 8-bit byte designs would be required to convert data constantly during I/O operations — thus adding substantial overhead to all software I/O functions.

• The standard is less reliable because more lines (wires) and handshaking (protocol) are required (Figure 14). In addition, failure in one part of the daisy chain affects the total chain (ripple factor).

Moreover, error correction is not part of the standard as proposed.

Finally, forced coexistence of old and new I/O structures would compromise future data security and system integrity requirements (Figure 15).

Concluding the I/O interface issue, we return to economics for the following, final note. ACT's Technology Analysis Group (TAG) looked at the current pricing structure for the IBM 3032, 3033 and 370/168-3. Its conclusion was that IBM 30XX channel costs are high and increased relative to the older 168-3 on a percentage basis (see Figure 16).

If these I/O channel prices have some relationship to IBM internal costs (hardware and software), then the other computer manufacturers are being asked by the Brooks committee to add from approximately 20% to over 29% to their mainframe costs. Obviously this represents a very substantial burden which would drive some firms out of the federal government business — thus reducing competition and ultimately increasing user costs.

The bottom line economic analysis (see Figure 17) dramatically illustrates the false economics of the position of the government or of those who would support the proposed I/O interface standard. While one may argue a few percentage points plus or minus about our large-scale system scenario, it seems impossible to avoid concluding that the standard at best would not save the government users any money; at worst, it could, in fact, cost the taxpayers 10% to 20% additional by 1980.

Finally, and most important, the economic scenario does not consider the essential costs associated with changing the thousands of applications software programs which would be required to use the obsolescent I/O channel standard.

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Editorial

One Small Step for Privacy

The bill calling for a Federal Information Practices Board, recently introduced in the House of Representatives [CW, Nov. 14] is a small step in the right direction — but only that.

True, the board would take responsibility for assuring that federal agencies are complying with the Privacy Act of 1974 — a job now vested in the already overburdened Office of Management and Budget. But without further legislation, the board would have no authority to deal with matters in the private sector.

The organization described in the legislation introduced by Representatives Edward I. Koch (D-N.Y.) and Barry Goldwater Jr. (R-Calif.) — a starting point for discussion, they admitted — could turn out to be an impotent paper-pushing organization rather than the effective data protection authority envisaged by the now-retired Sen. Sam Ervin and the original privacy protection architects.

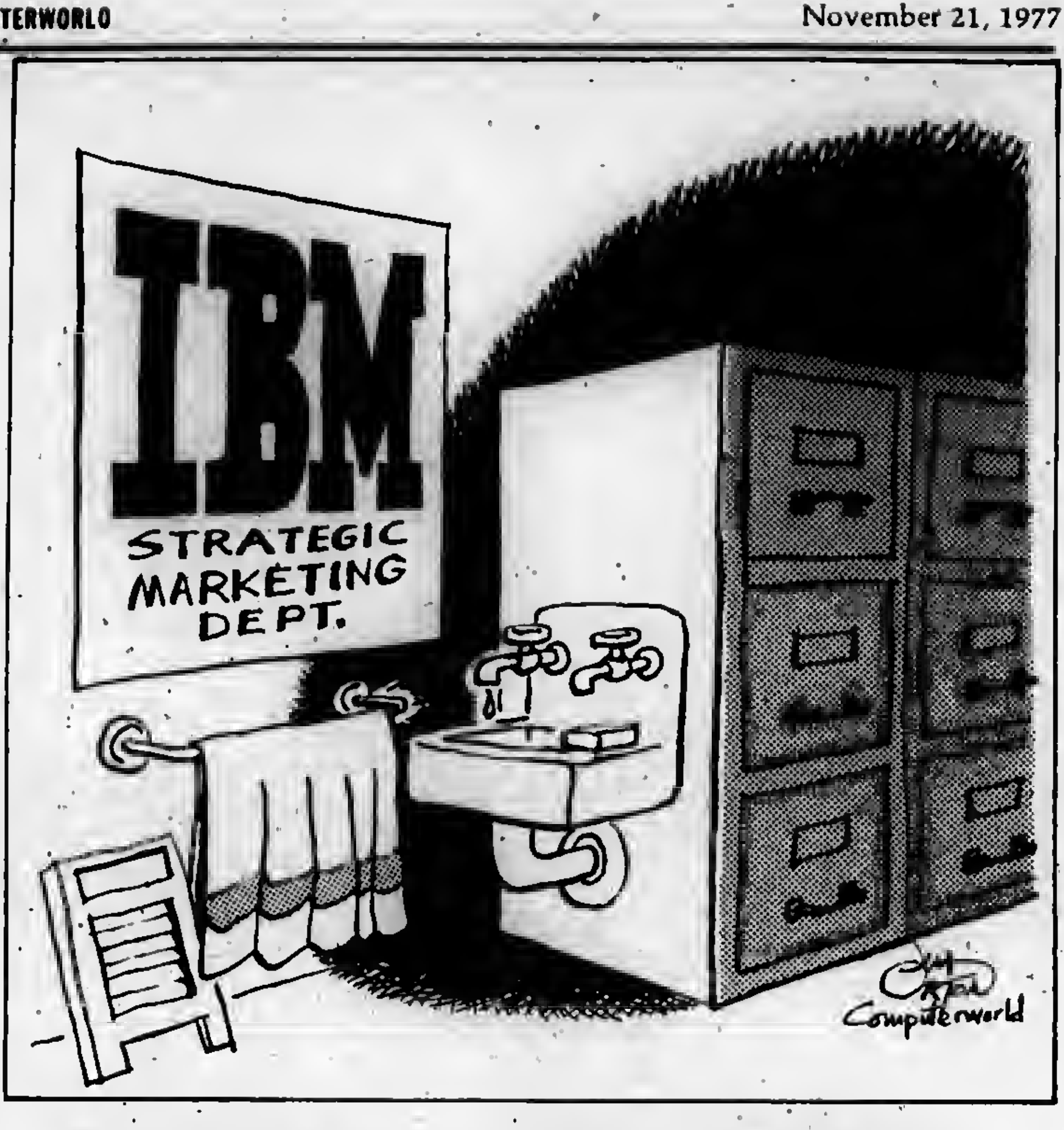
As described, the board would not even have the power to monitor the "voluntary compliance" that organizations in the private sector have suggested as the solution to the occasional privacy abuses their recordkeeping practices engender.

Second, U.S. firms providing domestic data base services for access by foreign companies stand to lose a good deal of business if these domestic firms are unable to meet the data protection requirements now being discussed and implemented by other nations.

The data protection authority would be the mechanism for assuring U.S. cooperation with foreign data protection laws or an international convention that protects the privacy rights of foreign citizens whose data is being processed within our borders.

The Council of Europe, in its draft International Convention on Data Protection, described the data protection authority as the body that would coordinate and investigate complaints on behalf of foreign nationals. It would also assure that governments and foreign businesses in each country where data is processed comply with the laws that prevail in the nation where the data subject lives — or the country where the data is registered as domiciled.

The data protection authority was watered down by those well aware of the political realities that prevail at this time. Indeed, if the President can't convince Congress that there is an energy crisis or that a federal consumer protection agency is needed to protect the health, safety and pocketbooks of the buying public, how can Congress be expected to see the need to protect something as vague as personal privacy?



Data Past

Five Years Ago
Nov. 22, 1972

YORK, Pa. — A jury here ruled that a salesman's promises, even if made only orally, could be binding if they were made to clarify vagueness or generalities in a contract. Observers saw this as jeopardizing the validity of thousands of "standard" contracts.

In the breach-of-contract case, a user sued Burroughs Corp. because of problems in implementing accounting applications on a small system.

— — —

WHITE PLAINS, N.Y. — IBM announced compatible subsets of the OS-based Information Management System (IMS), the Vancouver Data Language-One and Data Language/I-DOS/VS. The packages provided data base capabilities for conventional 360/370 DOS installations.

Eight Years Ago
Nov. 26, 1969

LOS ANGELES — An IBM expert told the Los Angeles County Elections Security Committee here that while it theoretically would be possible to tamper with the counting of election ballots under the IBM Votomatic system, security measures; testing procedures and the complexity of the system make rigging "virtually impossible."

William Kanaga said the system would have to be tampered with during the card-to-tape phase or during the compilation run.

— — —

LAS VEGAS — The financial position of the Association for Computing Machinery (ACM) was improving, it was reported at an ACM Council meeting here. George Glaser, Council treasurer, said the ACM position had been improved by about $43,000 since the previous June.

Letters to the Editor

Editorial Rubbish

In the editorial "The Real World" [CW, Oct. 31], you argue that the announcement of new IBM processors is proof of IBM's "power in the computer marketplace."

"In a truly competitive industry," the editorial concludes, "the other manufacturers would constantly offer products and price improvements and wouldn't wait to play 'follow the leader.' "

To subscribe to that theory, one has to accept that:

- Competitors other than IBM seldom or never offer new products with better price/performances, except in reaction to IBM.
- IBM seldom or never has to react to the announcements of competitors through improved products and better price/performance, but does so anyway.

That is rubbish.

J.R. Young
Vice-President
Communications
IBM
Armonk, N.Y.

Potential Pandora's Box

The editorial "U.S. Out of Step on Privacy" [CW, Nov. 7] unfortunately treats only the simplest and easiest consideration of the data privacy protection issue. There is no real dispute about the need to protect the rights of privacy for individuals. The U.S. information industry is, and has been, a practicing proponent of this. The tough problem is how to provide privacy protection for individuals without invoking a host of other serious new difficulties.

It is perhaps unfortunate that information and the control of its movement is intertwined with many potentially dangerous factors such as censorship, trade protectionism, cultural homogenization, national power and control, national sovereignty, economic viability, tax revenues and postal, telephone and telegraph authority monopoly policies. Many of the techniques and procedures being proposed for the ostensible purpose of protecting individual privacy happen to be rather effective tools for many of these other dangerous factors.

The U.S. information industry proposes that governments take the time required to study and understand these interrelationships so that legislation can be developed and enforcement procedures created that will provide protection to individual privacy, but avoid these related and dangerous factors.

Perhaps the future of journals like Computer*world* will depend upon developments in this area.

Alden Heintz
Vice-President
International &
Corporate Operations
Tymshare
Cupertino, Calif.

Almost Like Richter

Your expressed intent to establish a CPU rating system meaningful and fair to all should certainly be supported by all users ["Apples and Oranges," CW, Oct. 24].

With a multitude of variables to measure and ways to describe these measurements, you must feel as Richter did when he developed a system to describe earthquakes.

I feel a base configuration of equipment could be chosen from any leading vendor and that universally compatible exercising software could be written. When a run time had been established for that hardware, it could be assigned index 1.00. All or any other configurations and vendors could also be evaluated and assigned a positive or negative index.

Walter B. Campbell
Minot, N.D.

Last Responses to Litman

More Pros and Cons on Requiring Degrees

By Jack Stone
Special to CW

The Human Connection

Here is the final column of reader commentary on Regina Litman's letter [CW, July 4] dealing with the question of the need of employers to have DPers with college degrees.

M.S. Bump, DP manager for DuQuoin Packing Co. [in Illinois] extended Litman's explanations as to why employers may prefer degreed people. He wrote: "First, employers are aware that a great many more college graduates exist today than, say, 10 years ago. So why not hire an individual with the educational background as well as the experience?

"Second, one of the benefits of a degree is exposure to a number of subjects . . . to broaden the perspective . . . Doesn't it follow that such a [degreed] staff is probably, on the average, more promotable, more innovative and more adaptable?

"Third, Ms. Litman has offered a number of alternatives that could be substituted for a degree, all of them very good. But wouldn't such substitutions require an inordinate amount of screening to assure that acceptable standards are being met? And isn't it more effective to specify a degree rather than attempt to establish alternatives to a recognized standard?

"No doubt there are some companies . . . that feel only a college graduate is capable of doing [DP] work . . . This is snobbery in its worst form! . . . [Actually] I sympathize with Ms. Litman. I have been in the computer field since 1955 and have repeatedly encountered exactly the same closed door. I don't have a degree and have seen many advertisements for positions I felt sure I could handle, but for which I couldn't get an interview because of the degree requirement."

Postmilitary Experience

James Shannahan, a data systems programmer with Lockheed (in Sunnyvale, Calif.) described his job-hunting experience after leaving military service. ". . . I found the degree almost a universal requirement [for an outside hire] . . . I found several employers who viewed the degree as . . . evidence of a person's ability, but did not find any employer who related the degree to the work to be done.

"My experience . . . has been that having a degree will not do all that much for you other than get your foot in the door, but not having one will certainly hurt you.

"Could tbe answer [to recruitment] be a probation period where the applicant is provisionally hired for a short period?"

Leonard Jagoda, DP auditor with Blue Cross/Blue Shield of Georgia/Columbus, related the degree to management potential. He stated: ". . . Users are becoming more educated . . . To satisfy the user requirements and meet high professional standards, the programmer analyst that can comprehend these needs has a distinct edge.

". . . A college education provides much training in management skills that are needed in today's business world. Granted, extended experience can be very beneficial to businesses in the short run and training costs can be minimized; but, firms do not hire only for today — they must prepare for tomorrow."

The subject of educational attainment as a measure of compentence was addressed by S.J. Haremza, DP manager for Roblin Steel (Tonawanda, N.Y.). He said that "Criteria need to be established for (DP) professional positions on the whole . . . I am sure there are people who would make good doctors or attorneys who are not practicing medicine or law because they do not have a degree . . . Would Litman want one of these . . . people operating on her or representing her in court?"

Robert Hoberman, director of educational services for Insco Systems (Neptune, N.J.), takes the nondegreed position. ". . . Actually, there is very little support for the attitude of requiring college degrees for programmers . . . Unless the college graduate is trained in some field which he can apply to an applications area, most of his college education will tend to be superfluous . . .

"From a personnel viewpoint, a college degree may in fact actually be a negative qualification for programmers. The turnover of graduate programmers has been consistently higher than that of college dropouts or high school graduates. The reasons are reasonably simple: . . . Much of . . . programming involves mundane maintenance chores and a degreed programmer is often made restless . . . People with degrees tend to think well beyond their current jobs . . . and people with degrees in a personel market requireing degrees tend to have inflated views of their abilities and worth.

"On the other hand, the college dropouts . . . and high school graduates . . . seem to have a lower self-perspective and a great deal more staying power . . ."

Hoberman's viewpoint is supported by this note from a reader overseas who offers his "Observations based on experience: There is no clear correlation between having a degree and productivity. Many degreed people create ways of thinking that often are counterproductive.

William S. Turner III,
B.A. M.A. Ph.D."

Letters to Stone should be oddressed to him ot Suite 222, 2233 Wisconsin Ave. N.W., Woshington, D.C. 20007.

But Costly to Customers

Some 'Errors' for Sake of DP Convenience

The Taylor Report

By Alan Taylor CDP

The automatic charge feature provided by the Merchants National Bank of Allentown, Pa., is much like many other such options provided by banks around the country. It provides a check-protection system that comes in handy at the end of the month when small checks may push the checking account balance into the red.

This happened recently to Ronald Krikorian, a reader of this column, who would have gone $13 into the red on Aug. 15 if it were not for such an automatic transfer of $50 to his account. So far, so good.

One of the system's characteristics is that the due date for this "Instant Money" is selected by the depositor. Krikorian had selected the 15th of each month. On the day prior to the Sept. 15 due date, he repaid the loan in full plus 49 cents interest. That was, obviously, Sept. 14th. In fact, he had only used $14 for one day, $26 for two days before normal deposits had brought his checking account back into the black. However, interest on the whole $50/mo was due and was paid. That should have ended the transaction — but it didn't, as Krikorian found out when he got his next statement.

The Merchants National statement showed that although the due date for the instant money was the 15th, the bank had withdrawn a partial payment of $10 — from Krikorian's account on the 14th. Moreover, when the full balance had been paid, meaning that now the bank had received "instant" money from its depositor, it was just left sitting there and not returned to his checking account.

A month went by. In October, another statement arrived that showed another 41 cents "finance charge" on top of the eight cents shown on the September statement. The $10 was still in the Instant Money account. Krikorian subsequently changed some banking arrangement and informed me of his experience.

'Inside' Story

From the inside, the story significantly differs in point of view. The bank apparently puts priority on its own computer cycle rather than the calendar date when it establishes "due dates." Despite the date printed on the statements — "Due Day — 15. — and the bank's agreement with its customers, the due date the bank uses is based on when it ran the prior cycle — and it then allows 25 days!

Effectively, the bank was running on a 360-day-year calendar and pulling five days action from all affected customers per year. This was "Error" No. 1.

Its second error was in setting up the dates to see that while the customer might occasionally find himself one day off on due dates, the bank would not have the same problem when it came to taking money out of a customer's account for any reason. The withdrawal of $10 from Krikorian's account on Sept. 14th was not — as I had expected — a Sept. 14 mistake in not processing Instant Money payments before assessing the amounts to be taken out.

In fact, it was not a Sept. 14 transaction at all, although labeled as such. The bank had determined the previous day, Sept. 13, to remove the cash the next day without even considering whether or not there would be any need to do so when the due date arrived. Again, this is only a one-day difference but if universally applied, that can add up to a lot of money.

It also adds up to a lot of cost in another way, however. When these small errors are "one-sided" people won't see them as errors.

In this, they are quite right. As the appropriate person in Merchants said to me: "This is the way we calculate due dates. Don't you think it is right?"

It was wrong, but he seemed surprised that I didn't think that DP convenience outweighed a calendar and the printed output statement.

The public's perception that the apparent "errors" may not be errors at all but actually reflections of policy is correct.

As a result, the grass roots objection to the spread of automation — and with it the opportunity to make similar profitable "errors" — can be expected to continue, as evidenced in the dissenting portion of the report by the National Commission on Electronic Fund Transfers [CW, Nov. 7].

So the public/industry split will grow to a chasm, and into it will fall various opportunities for valuable new applications which need popular support, but won't get it until we are even-handed in our programming.

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Letters to the Editor

Basic Motivation

I would like to comment on the article "Newkirk Calls Motivation Real Job of DP Manager" [CW, Nov. 7].

Behavior theory is pretty clear these days about the idea that people are not motivated by others. They motivate themselves. I would propose that the role of a really good manager is not to see people as needing motivation, but as needing a leader who will clear away the blocks to their doing their jobs well. This point is poignantly highlighted in the letter to Jack Stone [CW, Nov. 7].

The way most managers seem to try to "control," which is one of the classical concepts of a manager's function, is by reward and punishment, as Newkirk pointed out.

The scientific literature on reward (better known as reinforcement) and punishment suggests that neither is really effective in human relations. The only way that "reward" works as a "motivator" is if the person being rewarded is in a state of deprivation with respect to that specific reward.

Thus, if money is to be a motivator, then the employee must perceive himself as underpaid. While this may make money a motivator, it also makes for one angry and frustrated employee, who will indeed "equalize the situation."

On the other hand, punishment certainly does not alter behavior; it merely defers it to another time. Thus, when a goal is not met, and "the employee or team [is] punished in some way," that will also make them angry and frustrated and cause them to set out to "equalize the situation."

I believe the successful manager is one who is seen by his subordinates as a person who goes out of his way to remove the roadblocks to success. We should realize that one of the great rewards of work is being allowed to do one's best and being appreciated for that.

Herbert A. Seidman
San Mateo, Calif.

Dispersing Incompetence

Having been so impressed with *Waves of Change*, I was disappointed to read the comments of Charles Lecht at the Systems 77 conference [CW, Nov. 7]. Assuming accuracy of quotation and validity of interpretation of his remarks, his prediction of the early demise of distributed DP (DDP) from the disease of "distributed incompetence" is based on questionable premises.

Granted that a lunatic fringe of the user community will jump into an ill-advised and indiscriminate embrace of DDP, most users will plot their courses carefully.

In many, if not most cases, the result will be a hybrid network of facilities encompassing the strongest elements of each mode of operation, centralized and distributed, based on the business function needs of the individual enterprise.

In the insurance industry, for instance, distributed processing is a logical answer to distributed business problems such as policy quote and issue, claims handling and even underwriting.

The shortcomings of host-driven terminal technology are not merely functions of host equipment cost. They are largely the result of overwhelming complexity of central hardware and layers of mediocre operating systems software together with the delay and failure potentials of heavily exercised communications components.

Such ills are not likely to be cured by more and cheaper centralized hardware.

Lecht's vision of platoons of incompetent technicians perpetrating mischief at corporate outposts is hardly realistic. Aside from growth, which will occur regardless of processing environment, DP function is being distributed, not added.

One or more languages may have to be learned, but it is the central staff of designers and programmers who will supply and manage the application tools for the field as well as those functions which properly remain at the large central host complex. It is unfortunate that the discipline and quality control which will be required have been so rarely exercised in traditional DP operations.

Lecht's assessment of IBM's stance on DDP should come as quite a shock to the Systems Communications Division. I'm sure it was not aware that the 3790 line is merely a temporary marketing gimmick to tide it over the DDP "fad."

Lee R. Prescott
Lebanon, Conn.

No Laughing Matter

Joe Rigo's "hip-shot" attack on certified DP professionals was not funny ["Grasshoppers vs. Ants," CW, Nov. 7]. Its effect is libelous.

After 13 years of demonstrated achievement, I am now self-employed as a consultant in DP. I have held the Certificate in Data Processing (CDP) since 1968, have maintained my knowledge and expertise in the "state-of-the-art" to the best of my ability and continue to abide by the CDP code of ethics.

Potential clients, especially those unsophisticated in the use of computers, may be influenced by Rigo's comments to exclude my services from consideration. Such a situation would result in a financial loss to me.

Rigo's diatribe may not only affect the consultant's income, however. It could also have a negative influence on the employment market for anyone who uses the CDP designation in a resume.

Rigo demonstrated his attitude toward the commandment "Thou shalt not bear false witness again thy neightbor" when he identified (by inference) certificate holders with the Aesopian grasshopper, when he stated the Institute for the Certification Professionals (ICCP) was set up "to sell certification exams" and when he ascribed pseudo-arguments to the target of his insults.

The Data Processing Management Association (DPMA) originated the certification program as a means of furthering its goal toward professionalism in DP. I am unaware of any deviation from that goal by the ICCP.

Robert R. Cromer
Dallas, Texas

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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THE PREMISE

1. Computers are not magic, they are only necessary.
2. Computer assistance in the areas of money, people, material and facilities can be correctly modeled and integrated by proper Data Base design.
3. Interactive computing can be highly cost affective but has its own special problems.

THE PROBLEMS

- The intrusive nature of a system installation must be understood and controlled.
- Internal company controls for data security must be supported by the system and followed by management.
- Audit trails for all transactions must be provided by the system and archived by the user.
- Checks and balances for data integrity must include at least those of a manual operation and must be reviewed by the user.
- Recovery from Data Base corruption must be fully supported by the system and understood by the user.
- Recovery from Data Base destruction must be fully supported by the system and understood by the user.
- The utilization of the computer as a limited resource must be supported by the system and managed by the user.
- Data entry facilities must be efficient, simple, unambiguous and capable of a variety of data verification and validation procedures.
- Data entry, data processing, inquiry, and report generation must be table driven where ever possible to permit change and enhancement.
- The Data Base design must permit new master files to be appended as enhancements with relative ease.
- The Data Base design must permit extensions to the record structures of the master files with limited or no implication to existing programs.
- The relationship between programs and files throughout the system must be an executable structure, which when listed is therefore an exact statement of that relationship.
- The same set of application system programs must be executable against similar, but distinct and independent, data base structures belonging to different users.

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Printer Buffer
The Hazeltine 1520 has a separate 2K printer buffer. Data communicated from the CPU to the Hazeltine 1520 printer interface at high baud rates are buffered down to the printer's speed. This allows you to attach a low-speed and perhaps low-cost printer to a high-speed communications system.

Transparency
The Hazeltine 1520 permits data to flow-through from the CPU to the printer without any change. You are not limited to formatting printed output, in accordance with the CRT display (typically limited to 80 columns). Printing is limited only by the printer's own capabilities. The terminal is transparent between your CPU and printer.

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NCR Test Site Reports:

VRX Puts Programmers Into High Gear

ATLANTA — On-line program development is helping the Atlanta Housing Authority (AHA) accelerate its applications programming schedule to the point where "we will achieve more during the next two years than we did the past five," according to Keith Bates, the authority's assistant director of finance for data processing.

The AHA is a customer verification test site for NCR Virtual Resources Executive (VRX) operating system, which makes on-line program development possible.

The authority has 11 computer analysts and programmers. Tenant accounting, maintenance and general ledger systems it developed are used by housing authorities across the country.

AHA acts as a service bureau for several other authorities. NCR 8200 minicomputers and NCR 7200 terminals are used to transmit information to AHA via telephone for processing.

AHA has nine major systems under development, each embracing 10 to 20 individual programs, Bates said. Overhaul of its on-line general system has been allocated 3,600 man-hours of development time.

Often programs to produce special reports or to incorporate tax changes must be developed on short order. So productive use of programmers, time and turnaround speed are important, he stressed.

On the other hand, he added, "If on-line program development were the only advantage offered by VRX software, I still would have jumped at it. We have also gained virtually unlimited memory. Our operators are more productive. Keypunching jobs have been eliminated. Disk storage is used more efficiently, and we have increased processing speed."

Chopped Into 'Pages'

As its name implies, VRX supports virtual storage. Main memory is only a small portion of addressable space. Programs are divided by the system into 1K "pages," which are usually stored on disk, to be brought into main memory individually as the logic is needed, Bates explained.

Built-in priorities let the software juggle processing times so main memory can be fully utilized at times when several programs run simultaneously.

For example, if AHA is running a typical five-job mix on one of its NCR Criterion 8570 CPUs, VRX makes 8M bytes available for each program — a total of 40M bytes of virtual memory. Without VRX, only the computer's 640K bytes of actual memory could be tapped.

Last June, when AHA became a test site for VRX, it also upgraded its equipment. The authority had previously had an NCR Century 251 with 16 NCR 657 disks.

Today it has two NCR Criterion 8570s, each with 640K main memory, plus a dozen of the faster NCR 658 disks which provide storage of 1.2G bytes.

With the old equipment and real-storage software, AHA needed more than six hours to run its maintenance work-order program. Now the identical program is processed in less than four hours, Bates said, crediting the increased speed to both VRX and the more powerful hardware.

"In this case, for approximately a 10% cost increase, we gained in the neighborhood of a 50% in production," he noted.

Morale Booster

On-line program development also improved department morale and the productivity of programmers and operators, according to Bates. Programmers no longer complain about compilations being postponed when other jobs are given priority, operators aren't interrupted by programmers, who no longer require computer room access, and a keypuncher has been freed for other duties.

Since VRX locates files, they don't have to be placed on specific spindles; this saves operator time. Also, two nonrelated files can be placed on the same disk, resulting in more efficient use of peripherals, Bates said, citing other benefits.

Links to Projects

About 50 NCR 796-401 and 796-101 CRT terminals link programmers and accounting and project supervision personnel located in AHA's main office and individual housing projects with the Criterion.

"With this network and the inquiry capability made possible through Cincom Systems' Total and Query Data Base software, any of our authorized personnel can inquire interactively into our data base, thus enabling them to operate with up-to-date complete information," Ernest C. Jackson, executive director of the authority, said:

AHA's conversion to the NCR Criterion and VRX was "painless," Bates added. The peripheral equipment was simply switched from one system to another, he said.

NCR's VRX will be available on a controlled release basis through the remainder of 1977 in cities where support is available. It is expected to be a general release in early 1978.

'Fsort' Handles Larger Files

LEXINGTON, Mass. — A major upgrade of a fast sort running under the Digital Equipment Corp. RSTS/E operating system, Fsort3 can sort blocked record files directly, according to the vendor, Evans, Griffiths & Hart, Inc. (EG&H).

The enhanced utility is also able to handle far bigger sort runs than the earlier versions, which were limited to 65,400 key records, a spokesman noted.

Fsort3 is compatible in important respects with DEC's RSTS-11 sort package, he said, adding that Fsort3, for example, accepts key files and "Type 1" files with or without headers.

It also contains modules which can be substituted for DEC's SQWIK and MQWIK facilities, he added.

The EG&H package accepts combinations of the following types of keys: ascending and descending Ascii, ascending and descending integer; and ascending and descending floating-point numbers.

Fsort3 is up to 40 times as fast as DEC's utility, according to stand-alone wall time comparisons, and up to 70 times as fast in CPU time comparisons, the independent vendor claimed. It can sort as many records or keys as an RSTS file can hold, the spokesman added.

The heart of Fsort3 is said to be a 4K machine-language runtime system installed under RSTS/E (Version 6B or later), which may be used with jobs whose user area is as small as 7K or as large as 28K, depending on conditions under which it is run.

Fsort3 costs $2,500 for a single CPU license, which includes update services and warranty for a year. OEM and quantity discounts are available, the company said from 55 Waltham St., Lexington, Mass. 02173.

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Independent Has Spitbol Compiler for PDP-11

OAK PARK, Ill. — A Macro Spitbol compiler for Digital Equipment Corp. PDP-11 minis has been announced by Dewar Information Systems Corp. The Macro Spitbol language is identical to Bell Telephone Laboratory's Snobol4 "with only some minor exceptions," according to a Dewar spokesman.

The DEC-oriented compiler is a full-blown Spitbol, he quipped, noting that the Dewar package is not a subset of the IBM 360/370-based version of the language that has been available for some time.

Spitbol is a string-processing language with "excellent pattern recognition facilities," he claimed. With that basic focus, it should be very effective in many business-oriented DP tasks; it is not designed for "scientific" number-crunching work, he added.

Instructions to Order

The macro facility enhances the language's usefulness since it allows the user to create instructions unique to his situation, the vendor noted.

Most Snobol4 programs will run under Macro Spitbol with minor modifications, subject to PDP-11 memory constraints, he noted.

The Dewar software will initially be released with interfaces to the RSX, RSTS, Unix and Duress operating systems. Under RSX, Macro Spitbol is a 32K task while under Unix and Duress it can be split into separate data and instruction segments. This would provide a 32K data element, the spokesman said.

The Macro Spitbol license costs $750 for commercial users and $550 for educational and nonprofit institutions. Quantity discounts are also available, Dewar said from 221 W. Lake St., Oak Park, Ill. 60302.

'CA-Sort' Performance Enhanced

NEW YORK — Computer Associates, Inc. has released an updated version of its CA-Sort package for IBM DOS, OS and VS shops. Release 78 is said to have "significantly" improved sort performance, I/O management and flexibility.

The improved performance was brought about by several features, a spokesman explained.

The sort itself has been fine-tuned for VS operations through use of monitor systems, he added.

Full support of Model 3350 disks, as provided by IBM's DOS/VS Release 34, has been built into the appropriate version of CA-Sort Release 78.

Optimum work devices assignment through internal resolution of work I/O conflicts is still another enhancement for DOS users working with Release 78, he added.

The Sort Reentrant Access Method (SRAM), a highlight of the earlier CA-Sort, is included in the packaging for DOS sites but is a separately priced option for OS installations.

The DOS and DOS/VS version of CA-Sort Releae 78 costs $5,500. The OS version for "stand-alone" single sort operation costs $5,050 while the SRAM option would add another $2,200 to that license fee.

Monthly leases are also available, the spokesman said from 655 Madison Ave., New York, N.Y. 10021.

'Edpep' Courses Back User Needs

WELLESLEY, Mass. — A series of courses sponsored by Babson College and QED Information Sciences, Inc. will be offered over the next 10 weeks at the Babson campus here. The courses are open to DPers generally as well as the members of the Electronic Data Processing Education Program (Edpep) under which they were developed.

Edpep is supported by almost 30 corporations and government agencies, largely in the Boston area, as a means of pooling resources to get better training than would be available to them individually. A council of member representatives meets periodically and determines what courses are most needed. The member organizations fund their employees' attendance at the courses.

Opening the courses to nonmembers is a recent change, an Edpep spokesman noted. "Public" tuition for the courses is $125/student day, he added.

A four-day course on "Leadership — Managing and Motivating People" will start next Monday, Nov. 28. A week later "Structured Design and Programming" will be the subject of another four-day program.

The final 1976 offering will run Dec. 13-16 and be a data base design workshop.

"Programming Strategies and Tactics" will make up the agenda of a three-day course from Jan. 16-18 and a systems analysis workshop has been scheduled for Jan. 31-Feb. 3.

Further information is available from Phyllis Tibbetts, Edpep Registrar, School of Continuing Management Education, Babson College, Wellesley, Mass. 02157.

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'Look' Extended for MVS, Also Gains Option for TSO

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has enhanced Look, its real-time performance monitor for IBM OS and OS/VS installations, by adding several MVS-related features, improved displays for existing Look commands and a pair of separately-priced options.

Two new commands are keyed to tracking the Auxiliary Storage Monitor (ASM) and System Resource Manager (SRM) facilities within OS/MVS. Other related features include commands that dynamically control the actions of the SRM, ADR said.

Two Options

The optional extensions of the package provide, in one case, more extensive analysis of the performance data captured by Look than was previously available and, in the other, tracking of the use of IBM's Time-Sharing Option (TSO).

The Extended Performance Analysis (EPA) option extends Look's long-term measurement potential by providing summaries, line graphs and histograms for better perspectives on system performance, the spokesman explained.

"In recognition of TSO's role as a major resource consumer," the spokesman said the Look TSO support includes analytical features to identify the percentage of CPU time used by TSO and the percentage of time available to the background partitions. It also shows the average swap loads in each region and the number of available buffers, he said.

The basic Look package ranges from $4,800 to $6,000 depending on the user's environment. The EPA option costs an additional $3,600 while the TSO Support adds $1,000. Monthly payment plans are also available, ADR noted from Route 206 Center, Princeton, N.J. 08540.

'Receivables' Run on 8080

HOLLIS, N.Y. — An interactive accounts receivable system designed for use on an 8080- or Z80-based microcomputer with floppy disks and a hard-copy printer has been introduced by Synchro-Sound Enterprises (SSE).

Written in an extended Basic, the software supports file maintenance, query and reporting functions, according to a spokesman. This support includes creation, modification and deletion of customer records and processing of transactions to be posted against the files, he said.

The system creates a history file of charges, credits and payment records for audit purposes. Payments can be against a particular invoice but if none is specified, the money will be applied to the oldest one outstanding in the customer's file.

Support for interactive inquiries about individual files is another feature of the package, he said. A batch-oriented reporting facility includes preparation of monthly statements, an aged accounts receivable list and delinquency notices.

The vendor generally sells a hardware/software combination that costs "less than $10,000" and includes a microcomputer, the software, a CRT and a Centronics Data Computer Corp. or Okidata Corp. printer.

SSE is at 193-25 Jamaica Ave., Hollis, N.Y. 11423.

Package Supports Use Of Array Processors Plugged Into Minis

NEWTON, Mass. — Computer Design and Applications (CDA) has a program development package for its MSP line of programmable array signal processors, which plug into Data General Corp., Digital Equipment Corp. and Interdata Corp. minis.

The software is written in Fortran and includes a symbolic assembler, a simulator and a programmable read-only memory (Prom) formatter.

The symbolic capabilities of the assembler make the microcode more readable, a spokesman explained. The simulator provides a high degree of reliability, he claimed, because it emulates the logical flow of data on the printed circuit board, down to the component level.

The software is free to users of CDA's processors but can be purchased by others for $9,900. Courses in programming techniques will begin shortly, the spokesman said, and will be held at company offices, 375 Elliot St., Newton Upper Falls, Mass. 02164.

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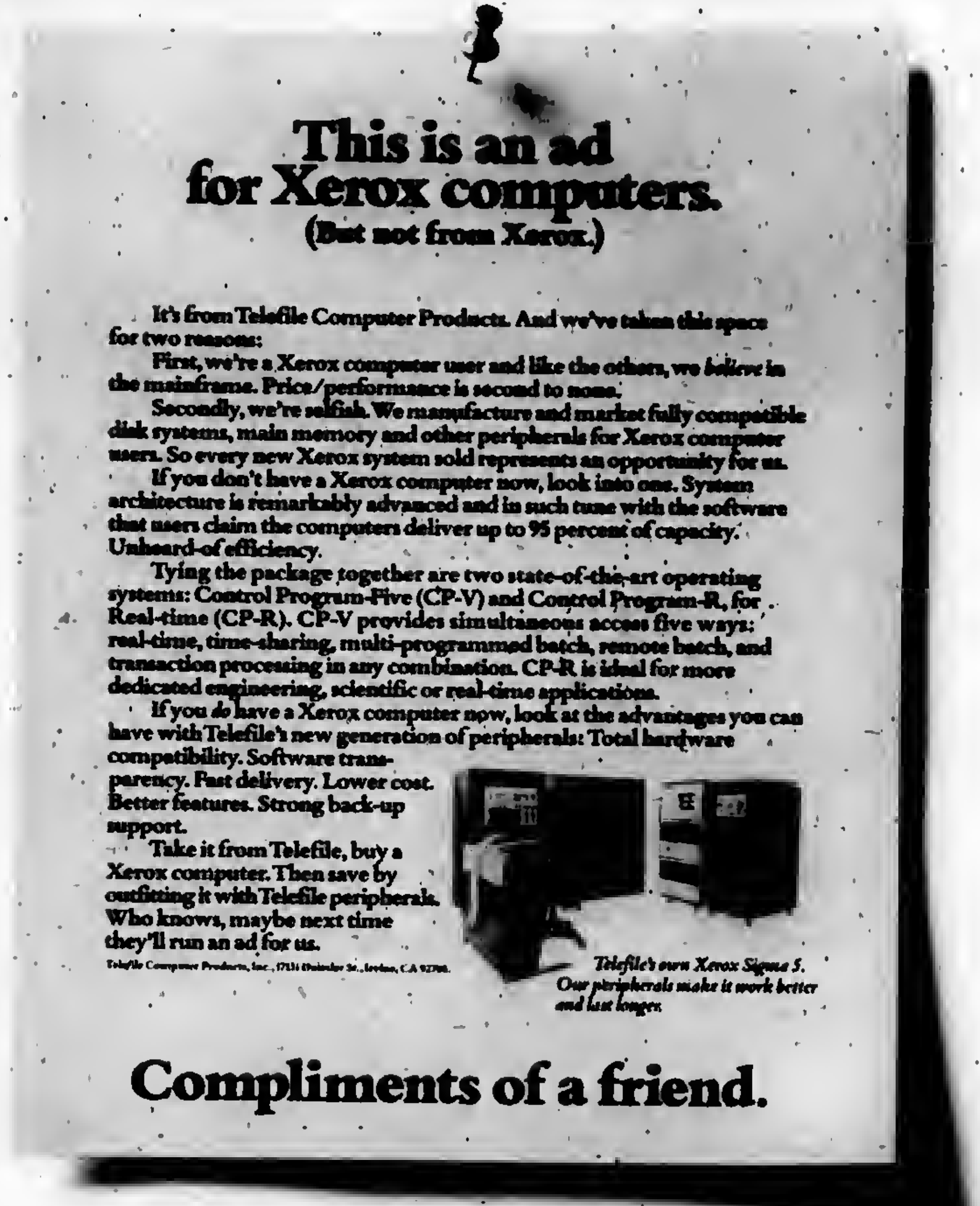

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It's from Telefile Computer Products. And we've taken this space for two reasons:

First, we're a Xerox computer user and like the others, we *believe* in the mainframe. Price/performance is second to none.

Secondly, we're selfish. We manufacture and market fully compatible disk systems, main memory and other peripherals for Xerox computer users. So every new Xerox system sold represents an opportunity for us.

If you don't have a Xerox computer now, look into one. System architecture is remarkably advanced and in such tune with the software that users claim the computers deliver up to 95 percent of capacity. Unheard-of efficiency.

Tying the package together are two state-of-the-art operating systems: Control Program-Five (CP-V) and Control Program-R, for Real-time (CP-R). CP-V provides simultaneous access five ways: real-time, time-sharing, multi-programmed batch, remote batch, and transaction processing in any combination. CP-R is ideal for more dedicated engineering, scientific or real-time applications.

If you *do* have a Xerox computer now, look at the advantages you can have with Telefile's new generation of peripherals: Total hardware compatibility. Software transparency. Fast delivery. Lower cost. Better features. Strong back-up support.

Take it from Telefile, buy a Xerox computer. Then save by outfitting it with Telefile peripherals. Who knows, maybe next time they'll run an ad for us.

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It's a new industry being pioneered by Telefile. Applying latest technology, we revitalize computers so they can do more work faster. It may mean faster memory or peripherals. Or simply "black boxes" that extend a computer's capability beyond previous design limits.

Take Xerox. Since early 1975, when our ad appeared, Telefile has announced over 24 new Xerox-compatible products.

Compact main memory, high speed printers, communication processors, solid state RAD's, array processors, and on and on.

Most have powerful performance, reliability, and cost advantages over the Xerox units they replace. More important, they're available.

Recently, we announced a new mass store facility that brings "Winchester" disk drive technology to Xerox users – something previously available only to IBM users.

Telefile has even taken over complete system maintenance at some sites. Our service network now stretches to over 20 cities and it's growing monthly.

And now to give Xerox users room to grow, Telefile is embarking on the development of *two new microprogrammed Sigma mainframes* for introduction in 1978. One will run four times faster than Xerox' biggest machine, yet cost only about half as much.

That's computer enhancement. To Xerox users it means a way to take their computer investment and superior software into the 1980's in style.

Univac users, you're next.

Telefile
Enhancing computers is our business.

Who Cares About the Forgotten Old End User?

By Robert J. Bergstrom
Special to CW

Not to be forgotten midst the great technical and intellectual debates concerning structures and administration of data bases is the man who makes it all possible — the Forgotten Old End User (FOE).

The FOE does not care a great deal about the structure of the data base. Hierarchies remind him of corporate superstructures or governmental bodies. The network approach — no matter how rational or well-thought-out — is not within his normal frame of experience, consisting as it does of webs of lines interconnecting dots for mysterious reasons. The newer relational structures sound more promising, but a closer look reveals even more complications than the others.

The FOE quickly realizes the knowledge required to decide which type of structure to use, let alone how to apply that structure to his data requirements, is not within his scope of business or recreational activities. Furthermore, the subsequent management of that mass of data does not require his attention. While he recognizes the need to add, delete and change elements of data, he has no need to participate.

All of these realizations are positive — not negative — if understood and placed in perspective.

Input Essential

The FOE will not (or at least should not) be involved in either structuring or administering a data base, whether it is a major corporate information system or a more simple special-purpose data base. His inputs to the process are essential — what information does he have, what would he like to have, how does he alter it, how does he use it. All these elements must be taken into account by the expert who designs the data structure and the administrator who subsequently manages it.

What does the FOE need to become a friend? (Find a Reasonable Incorporation of the End user Needs for Data!) For a FOE to take advantage of the work put into the construction and maintenance of a data base, he must be able to access the information he needs and display it in some understandable form. The important aspects of the system are thus retrieval (selectivity), sorting (meaningful rearrangement) and reporting (simply and clearly).

Those data base management (and data management) systems that have been designed to accommodate these seemingly "simple" requirements in a manner clearly understandable by a nontechnical end user provide opportunity for substantially higher return on the investment in installation.

The remote computer service (RCS) vendors have traditionally had two major concerns in the development of software — efficiency of operation (to minimize costs) and customer ease of use (to maximize revenue). Some of the products available on these networks are impressive results of efforts to enable the users to access data easily and precisely.

For the most part, the RCS vendors operate with specific data bases, rather than a massive, interconnected corporate system. The reasons for this approach are basic and sound — the sales cycle is relatively short, the installation can be almost immediate, and customer satisfaction with actual use closely follows the decision to go ahead.

Many special-purpose systems exist that efficiently deal with public data bases in the economic and securities areas. These were designed from experience with user activities and effectively conceal the technical aspects in a conversational environment. The next step was to provide a more generalized system that could be used with a wide variety of data — both public and private (or corporate) data bases. The aspect of real value to the end user is the retrieval and reporting system — either as an integral part of the data base management system or as a stand-alone system that can interface with an established base of data.

Three areas of major importance are addressed in an understandable form by these user-oriented systems — selection, statistical extracts and reporting. In combination with inherent logical arithmetic functions, the end user has great facility opened to him directly — no need for technical assistance to answer his questions.

For example, to find out the names of female employees in New York who are in upper job classes, how about:

```
SELECT SEX = 'F' AND LOC =
'NY' AND JOBCLASS GT '14' or
LIST IF SEX IS F IF LOC IS NY IF
JOBCLASS EXCEEDS 14
```

To find out how many employees or

(Continued on Page 32)

This is an ad for Univac computers.
(But not from Univac.)

It's an unsolicited testimonial from Telefile Computer Products. And we've taken space again for two reasons:

First, for sheer number crunching and handling of large data bases, Univac computers are in a class by themselves (how else could they thrive under a quarter century of IBM competition?).

Secondly, there are hundreds of *older* Univac installations that could benefit significantly from Telefile's computer enhancement capabilities.

Key to Univac's success has been its evolutionary approach to systems design. The new 1100 Series machines are direct descendants of the Univac 1108, first installed in 1964 and still running strong.

But as 1108's and other models have grown older, remarkable evolutionary advancements in memory, peripheral and mass storage facilities have grown up around them. One way users could upgrade was to change out the mainframe into a gleaming new model. Univac makes it easy by keeping the software compatible.

Think of Telefile as being *counter-evolutionary*. We reverse the tides of time by applying new memory and accessory design to computers hobbled by the past.

Take our new fully compatible add-on memory for Univac computers. By taking advantage of latest technology, it runs faster, takes up less floor space, and runs on only one-third the power of the Univac memory it replaces. No software changes are required. And costs *are cut about 70 percent.*

We currently offer unitized memory for 1110, 1100/40 and 1106 processors; and multi-modular memory for Univac 494, 1106, 1108, and 1110 processors.

Both memory types are currently up and running on Univac computers. On one, overall system throughput has been boosted by a remarkable *30* percent!

But this is just the start. Coming down the line are a solid state drum replacement and disk systems that leapfrog 3330 technology. Not to mention some other exciting developments we'd rather not mention right now.

We don't expect Univac to run an ad for Telefile, but someday the users might.

Write: Telefile Computer Products, Inc.,
17131 Daimler St., Irvine, CA 92714.
Phone: (714) 557-6660.

Telefile's Univac-compatible memory (left) saves money, power and floor space.

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Programmerless DBMS Aids Manufacturer

By C. Thomas Driscoll
Special to CW

MONTREAL — Spar Technology, Ltd. can be characterized as a sophisticated, high-technology manufacturing environment with very strict requirements. Spar Technology has two business groups each with its own plant. One, Communications Systems, manufactures earth station and microwave communications equipment, while the other, the Aerospace and Government Systems group, manufactures spacecraft (satellite) antennae and transponders.

Until recent years, Spar has fixed product lines and very little change in product definition. At that time we were using a standard preprogrammed batch DP system which was designed for our classic product line environment.

Then Spar's manufacturing process changed to a project environment, in which we were manufacturing only limited quantities of highly specified projects at a time. This change to a dynamic project environment was characterized by a high quantity of engineering and other change activity.

At the same time, more sophisticated user groups were demanding more of our DP system. Our users now required on-line access to updated information. They wanted a system which would be able to incorporate changes more rapidly and to simultaneously analyze the effects of these modifications on the entire manufacturing cycle.

While the batch DP system had been adequate when Spar manufactured static product lines, the changeover to a project environment left us with a system unsuited to our business.

Primarily, the batch system was not flexible enough for our new needs. It was incapable of responding to more frequent change and it could not be modified quickly. In addition, the information we needed was relatively inaccessible. The system had to be run in its entirety with a fairly long turnaround cycle. This cost us time, money and convenience.

The batch system lacked some significant subsystems. We now needed capacity planning and materials requirements planning (MRP), which was becoming increasingly important in our project-related business, with tight time scheduling. With these increasing areas of inadequacy and dissatisfaction with our DP system, we knew we had to find an alternative.

We rejected the idea of rewriting our old system because it was too complex. A rewrite would have required expenditure of time and money we could not afford. We considered buying another preprogrammed package but, because of our previous experience, we felt we needed more flexibility than a package could provide.

In addition, we did not see any preprogrammed packages that were oriented toward project manufacturing or that could accommodate our special cost tracking and configuration management requirements.

Different Approach

Given those conclusions, we knew we needed to move to a higher level of technology, to an entirely different approach. The solution was to utilize a fully integrated data base manufacturing system.

We decided to install a system developed by Mitrol, Inc. of Lexington, Mass., because it offered us the ability to incorporate changes as we learned more about our requirements and how we wanted to handle them. It was a system that could be easily modified and quckly updated. Mitrol also offered a system that could be specified and operational within a short time because there was no need for traditional programming, since Mitrol is a self-contained programmerless system.

In addition, the system offered direct access to the user groups. It could provide our users with on-line access to updated information under their direct control. Perhaps most importantly, Mitrol's system could easily be modified directly by the user groups, without requiring DP expertise.

In designing the new system, our user groups talked directly with the Mitrol people to define their requirements on the system. Basically, the users designed the system they needed. It was particularly useful to have the users participate in the design stage because they not only got the system they needed, but they became much more aware of the importance of their role in the efficient functioning of the entire system.

The conversion period was very short. Since more of our data was already computerized, we went from computer to computer, which was quite convenient. It took less than five months, from the time we chose the Mitrol system, to have it fully operational.

Our current application of the system incorporates 18 data sets with over 300 separate updating and reporting transactions that we defined. Our application includes bill of materials maintenance, purchasing and receiving, production planning and scheduling through MRP, labor reporting, work in process control and cost reporting and control.

We actually developed a total management information system for these two manufacturing facilities, almost entirely through the interactive Mitrol request language. Our experience indicates that programmerless systems have truly come of age.

Driscoll is technical systems coordinator with Spar Technology, Ltd., a division of Spar Aerospace Products, Ltd., Montreal.

Don't Forget the End User

(Continued from Page 31)

how much salary expense is in specific departments in each area, how about:

COUNT EMPLOYEES BY DEPARTMENT ACROSS AREA, or

TABULATE SALARY ACROSS AREA BY DEPARTMENT

To report on sales activity by month across sales areas (including spacing, report titles and headings), how about:

LIST BY MONTH SKIP 1 ACROSS AREA SUM (SALES)

TITLE 'MONTHLY SALES'

To prepare a report by product (and in total) for the first six months and compare first and second quarter results, how about:

SUM SALES AND COLUMN TOTAL ACROSS MONTH

COMPUTE RATIO = (C4+C5+C6)/(C1+C2+C3)

BY PRODUCT IF MONTH FROM 1 TO 6

Try some of these oversimplified problems on the automated system you are currently using, or compare the conversational response to the manual search time.

Hope Exists

As you can see from this review, hope exists for the FOE. Some of the available software has been designed to make it easy for him to find what he wants, compile needed answers and display them as desired. These systems may still be in the minority, but their superiority is so evident that the demand will soon force a new level of excellence in this most important application area.

Bergstrom is executive vice-president of Real Decisions Corp. of Stamford, Conn.

Pascal Ready For DG Units

PALO ALTO, Calif. — A Pascal compiler for 32K Data General Corp. Nova and Eclipse systems using RDOS is now available from Gama Technology.

Pascal is a high-level language which facilitates structured programming. It was originally designed by Niklaus Wirth of ETH in Zurich, Switzerland.

Gama's compiler, developed at the University of Lancaster in England, implements the P4 standard of the language.

The program binary code is distributed on 9-track 800 bit/in. magnetic tape in RDOS dump format and it costs $70, he said from 800 Welch Road, Palo Alto, Calif. 94304.

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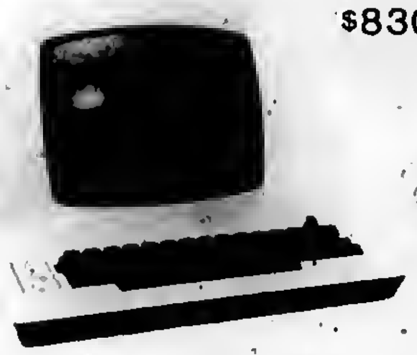

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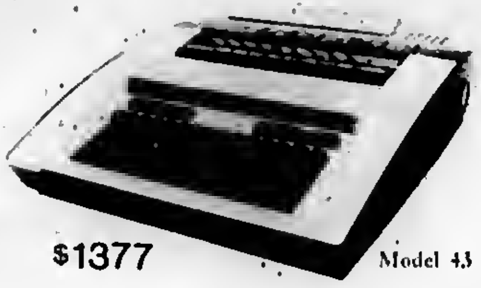

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A multiple choice quiz on Keybatch.

A multifunction data entry system from Data 100.

(WARNING: there may be more than one right answer to each question)

---

1. Keybatch is:

(a) a multifunction intelligent key-to-disk data entry system.

(b) a brand new multifunction system from Data 100.

(c) a multifunction system which supports high volume concurrent batch capabilities.

2. Keybatch is also:

(a) a multifunction system offering stand-alone RPG for expanded user flexibility.

(b) a multifunction system that can operate with on-line file inquiry capabilities (3271 compatible) via common keystations for both data entry and on-line file inquiry.

(c) a system capable of handling mail sorting and other office tasks.

3. As a data entry system:

(a) Keybatch has up to 20 megabyte disk storage capacity.

(b) Keybatch is proven with approximately 900 units now in use.

(c) Keybatch can be configured with 2 to 16 keystations.

4. For the end user:

(a) Keybatch meets short range goals such as appreciable dollar savings.

(b) Keybatch provides for long range system growth.

(c) Keybatch offers both of the above.

5. For more information on Keybatch, you should:

(a) search frantically through your EDP literature files.

(b) write Data 100 at 6110 Blue Circle Drive, Minnetonka, MN 55343.

(c) call your nearest Data 100 sales office or one of the numbers we've listed.

Are you a multifunction expert? Check these correct answers.

All answers but four are correct.

1b: Keybatch isn't brand new, was introduced in 1974.

2c: Sorry, Keybatch can't do everything.

3b: There are actually 1500 Keybatch systems on the job worldwide.

5a: No need to search when we're so easy to write or phone. Do it now.

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Charges Harm to Private Lines

Adapso Asks FCC to Put Curbs on IRCs

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — International data base services being introduced by international record carriers (IRCs) are "an unlawful means to curtail and/or eliminate the availability of private line service," according to a document recently filed with the Federal Communications Commission (FCC).

The charge was made in a petition by the Association of Data Processing Service Organizations, Inc. (Adapso) to deny international service applications made by ITT World Communications, Inc., RCA Global Communications, Inc. and Western Union International, Inc. (WUI).

According to the Adapso filing, the ITT, RCA and WUI services are identical in that they are designed to provide users with a half-duplex, 2,400 bit/sec service between host CPUs, or data terminals using packet-switching techniques.

The proposed services will provide links between the U.S. and Hong Kong "specifically engineered for the transmittal of data from computer to computer or from terminal to terminal," Adapso told the FCC.

Subscribers in the U.S. will be able to access the services through the Tymnet, Inc. or Telenet Communications Corp. networks; in Hong Kong, access will be by private lines and the operating center of Cable and Wireless Ltd.

The proposed links to Hong Kong represent "an attempt by the IRCs and their foreign correspondent Cable and Wireless Ltd. to eliminate private-line service in the Pacific Basin," Adapso said.

Letter Cited

The petition referred to a letter sent by Cable and Wireless to General Electric Co. which said "we would not be prepared to provide General Electric Information Services with a private leased circuit from Hong Kong to either Singapore or the United States."

The letter called attention to the data base services being planned by the IRCs and said, "It is our hope and desire that this service will satisfy your needs and the needs of others like yourselves."

Adapso told the FCC the services being proposed by the IRCs "involve the absolute elimination of basic private line service ..." Such a move would be a violation of the commission regulations and specifically Section 214 of the Communications Act of 1934, which states that private line service "cannot be curtailed without appropriate authorization from the commission," Adapso said.

If the carriers plan to eliminate private line service offerings, detailed information would have to be provided to justify such a move; a statement would also have to be provided showing the public convenience and necessity would not be adversely affected by such discontinuance of service, the petition said.

If GE is required to use the data base sevices to serve its time-sharing customers, additional and needless costs will be incurred because GE will have to acquire interface equipment to accommodate the non-standard features of the proposed services, Adapso said.

The petition also referred to a recent recommendation to Consultative Committee on International Telephone and Telegraph (CCITT) by the Italian postal, telephone and telegraph (PTT) authority which recommended that "in order to safeguard revenue ... point-to-point based circuit service [private lines] should be disciplined with rates based on volume of data transmitted or

(Continued on Page 36)

Emulation System Withdraws Bank's Compatibility Problem

MEMPHIS, Tenn. — Banking was one of the first major businesses to utilize data communications on a large scale. However, the proliferation of computer equipment from a wide variety of vendors in the mid-1970s often created compatibility problems.

The Union Planters National Bank here believes it has solved that problem with a data entry and communications system that emulates 18 other devices.

The System 2405-2 from Mohawk Data Sciences Corp. (MDS), which is used exclusively as a remote job entry terminal, "has allowed us to consolidate several different data communication functions in one reliable 'black box.' As a result, we have been able to increase our capabilities in response to new demands without increasing our costs," according to Al Bacon, Union Planters vice-president.

The System 2405-2 utilizes an IBM 2968 protocol emulator which allows an on-line communications link with twin IBM 360/65 mainframes via modem simulators. Both systems are located at Union Planters' central Memphis facility.

The MDS System 2405-2 fulfills four major functions which might otherwise have required four separate communications systems. The MDS system, which features protocol emulators for 18 different devices, links Union Planters with the St. Louis-based Master Charge network; allows the bank to tie indirectly into the Visa charge card network through an issuing bank in Georgia; and performs data communications with a Michigan service bureau relevant to "lock-box" operations.

The System 2405-2 also features selectable transmission rates which allows Union Planters to transmit data at 1,200-, 4,800- or 9,600 bit/sec — whatever is required by the devices on the other end of the communications link.

Bacon estimated monthly net savings of $700 to $750 as a direct result of implementation of the System 2405-2 last January.

(Continued on Page 36)

Coupler Designed For Teletype 43

SKOKIE, Ill. — Comdata Corp. is offering an acoustic coupler designed to operate with the recently released Teletype Model 43 terminal.

The 150A2-14C, an addition to Comdata's 150 series of couplers and modems, operates at 110- or 300 bit/sec in either half- or full-duplex mode. It weighs 24 oz and draws its power directly from the 43, Comdata said.

The coupler is available for $147 from the firm at 8115 Monticello Ave., Skokie, Ill. 60076.

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Line: Dial or dedicated
Options: Voice-plus-data, data regeneration

$465 basic unit
$325 channel end

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Data rates: Mixture of synchronous or asynchronous up to the high speed modem aggregate
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Options Auto speed detection, multi-drop

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Emulator Helps Bank Cut Compatibility Snags

(Continued from Page 35)

That figure is based on the actual cost of two devices the System 2405-2 replaced and the projected cost of two new devices that would have been required to handle new applications.

According to Bacon, Union Planters considered several vendors when it decided to streamline its RJE functions. "The MDS price was comparable or lower than the other vendors we looked at," he siad. "However, what really convinced us to go with the System 2405-2 was the fact that MDS would comit to performing the whole job in a timely fashion. All four applications were up and running in less than 30 days."

The MDS System 2405-2 replaced two RJE units, a Sycor 340 and an MDS 6403 data recorder, for $49/mo less than the combined cost of the two units.

Utilizing two different protocol emulators, the System 2405-2 allows Union Planters to tie into a fixed-format Sycor-based Master Charge network and to transmit lock-box data to an MDS 6403 in Michigan. In lock-box operations, organizations such as insurance companies and utilities contract with banks in local areas to receive, preprocess and forward remittances to the company or to the service bureaus which handle their central data processing.

Accordin to Bacon, "Providing lock-box services and transaction processing services related to national credit card systems are increasingly an important and highly competitive part of the banking industry."

The System 2405-2 also allows Union Planters to transmit Visa documents to an MDS System 2409 at an issuing bank in Columbus, Ga.

A fourth System 2405-2 application allowed Union Planters to remove an 800 bit/in. tape drive from its 360/65s. The mainframe configuration originally included nine 1,600 bit/in. tape drives and one dual-density 800- and 1,600 bit/in. drive. The bank has now upgraded to 6,250- and 1,600 bit/in. drives.

However, certain applications require the 800 bit/in. capability. For example, Union Planters does accounts reconciliation for a number of commercial customers who have their own computer systems.

Tapes Provided

In addition to issuing printed statements on checking account activity, Union Planters provides tapes with different densities which can be run on the customers' equipment. In order to provide that service in a more cost-effective way, Union Planters' DP staff created a communications program that allows transfer of the account reconciliation data from the 360/65 6,250 bit/in. tapes to 800 bit/in. tapes on the MDS system and vice versa.

In November, Union Planters will add an additional communications link — via the MDS System 2405-2 — between the 360/65s and an NCR 615 mainframe at another bank 75 miles away. This link is in support of another on-line automated teller machine. In this case, the MDS System 2405-2 will be used to solve a compatibility problem for both banks.

"The NCR link was an unanticipated benefit of the MDS System 2405-2. Because we already had the RJE system in place, what could have been a communications problem was simply another communications application," Baçon said.

Adapso Asks Curbs on IRCs

(Continued from Page 35)

elapsed time of transmission.

In a similar petition filed with the FCC, the Computer and Business Equipment Manufacturers Association (Cbema) said "there is now a real and present danger of not merely [flat-rate private line] impairment, but absolute curtailment of the tariffed offering."

Flat-rate and volume-sensitive services should be allowed as "co-existing alternatives" for providing data transmission services between the U.S. and Hong Kong, Cbema said.

"The facts clearly suggest a passive acceptance by the IRCs of [Cable & Wireless'] intent to replace one service with another" and it would be hard to believe the refusal to provide service was made without the knowledge of the IRCs, Cbema said.

A U.S. government source said there is serious concern about the perceived attempt to eliminate private line flat rate international service. A letter to this effect reportedly has been sent to the U.S. State Department urging that policy be established supporting private line facilities.

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TI's new portable means remote

Until now, remote order entry meant expensive on-line operation with a computer via a telephone line.

But TI has changed all that.

The new *Silent 700** Model 765 Portable Memory Terminal has built-in bubble memory. So it can remember, even when the power is off, while it waits to talk to your computer.

With the 765 you can enter sales and order information all day long using the typewriter-like keyboard.

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The 765's powerful, yet easy-to-use text-editing functions let you add, delete, locate, and correct data on the spot. So you can transmit more accurate data when the phone rates are lower. At a fast 30 characters per second.

Traveling companion. Lightweight portability is the key to convenient field use. And at 17 pounds, the 765 is really compact.

But it's no lightweight when it comes to features. With its built-in numeric cluster, keyboard with upper and lower case characters, quiet 30-cps printer, and acoustic coupler for telephone connection, the 765 is a heavy-duty operator.

And the 765 gives you plenty of storage space. The basic terminal comes with 20K bytes of memory. And it can be expanded to 80K bytes—the equivalent of up to 20 fully typed pages.

Distributed Processing System

IBM 3270 Compatibility Feature of Harris 1670

DALLAS — A distributed processing system that includes an IBM 3270-compatible CRT terminal has been introduced by Harris Corp.

The Harris 1670 is an addition to the company's Series 1600 family of remote batch terminals and distributed processing systems. It is reportedly aimed directly at users requiring both remote job entry (RJE) and clustered 3270-type interaction with a host data base while performing a mix of local functions ranging from interactive data entry to batch Cobol applications.

The switchable terminals are said to give the 1670 processor the ability to handle local and remote and batch and interactive applications equally well at the same time. Their compatibility with 3270-type systems offers users operational and economic advantages, and applications already running on a host IBM 360 or 370 do not have to be reprogrammed, a spokesman claimed.

Typical applications for the 1670 will include remote and local interaction, source document entry and data manipulation, he added. The 1670 can help users logically distribute portions of their data bases and their data processing, he said, while providing a "switched terminal" that facilitates communications with host computers.

For users who already have both clustered 3270-type and RJE terminals at the same location, the 3270-type terminals can be replaced by the 1670 using existing plugs and cabling, without interrupting host function or programming, Harris said.

Hardware and software for the 1670 are compatible with all other members of Harris' 1600 family of remote batch terminals and distributed processing systems, the spokesman noted.

Primary 1670 hardware includes up to 96K bytes of 750 nsec main memory, up to 96M bytes of disk storage and an ability to use as many as 28 CRT terminals in a single system. Standard Series 1600 peripherals include card readers and punches; line, matrix and typewriter printers; magnetic tape drives; cartridge and flexible disk storage; and incremental plotters.

In a 1670 system, up to eight terminals can be 3270-compatible devices that are switchable for local and remote interaction between a 1670 and a host 360/370 computer; eight can be 3270-like terminals for dedicated communications with a host computer; and the remainder can be Harris 1675 CRT/keystations that are connected locally or remotely to the 1670, the spokesman said.

Interactive 1670 control of 3270-type terminals is completely transparent via a programmable microprocessor having a 16K-byte control memory and 8K- or 16K bytes of buffer memory, he added. The 1675 terminals are under control of the 1670 operating system.

Operational RJE emulation packages support remote communications with a variety of IBM, Univac, Honeywell, Control Data, Burroughs and Amdahl mainframes, according to the spokesman. Self-diagnostics provide local hardware testing to the circuit level.

A typical Harris 1670 including 82,304 bytes of main memory, four switchable terminals, four non-switchable terminals, a 6M-byte disk drive, one 800 bit/in. magnetic tape drive, a 300 line/min printer and 9,600 bit/sec communications will lease for about $2,658/mo on a three-year lease, including maintenance, and sell for about $109,616.

First deliveries are scheduled for February from Harris at Box 44076, 11262 Indian Trail, Dallas, Texas 75234.

Techtran Introduces Hand-Held Recorder

ROCHESTER, N.Y. — The Porta 200 hand-held data recorder is the latest addition to Techtran Industries, Inc.'s family of digital cassette units.

Designed for any application requiring large-capacity, portable data entry, the 3-lb battery-powered unit can be used to input and store data for warehousing, inventory control, field site data acquisition and retailing, the firm said.

As the operator enters data on the 16-key pad, it is displayed for verification and recorded on an 85,000 character digital cassette.

The cassette can be read on any Techtran RS-232 plug-compatible Datacassette for transmission to both local and remote terminals and CPUs, according to the company.

The Porta 200 is priced at $825 including battery and charger. Techtran is at 200 Commerce Drive, Rochester, N.Y. 14623.

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Many people want a terminal with the features of the 765 for applications where portability is not required. So we designed the Model 763. A table-top version of the 765, the 763 has the same performance capabilities in a compact unit, and comes standard with either a TTY current loop or EIA interface instead of the acoustic coupler.

Small price for remembering.
TI's new Model 765 Portable Memory Terminal is priced at only $2,995.† Additional 20K increments of bubble memory are $500† each.

And, the table-top Model 763 at $2,695† is another price/performance leader. Of course, quantity discounts and a complete range of lease programs are available.

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When it comes to price/performance, Itel has always been a sensible alternative to IBM. Now, when it comes to reliability, availability and serviceability, the 7350, with its built-in computer, makes Itel the only alternative.

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Terminal Transactions

Cluster System Handles Dispersed Data

CORNWELLS HEIGHTS, Pa. — A cluster system that reportedly suits small business applications requiring immediate access to local data bases has been introduced by Delta Data Systems Corp.

The Delta 6500 system holds up to 1.5 million characters of storage and allows up to eight Delta 4000 display terminals to share a processor, host communications port and two printers, the company said.

Systems modules include a 64K-byte processor, IBM 3780-compatible bisynchronous communications interface, printer and floppy disk interface.

Delta 6500's three-level software package incorporates an operating system, file management system and program development system, a Delta Data spokesman said.

The operating system controls the operation and interaction of all system modules and offers functions like system IPL, applications software loading and loading/execution of various debug routines, the company explained.

The file management system allows operators or applications programs to create, retrieve and edit information stored on diskette files, the firm added.

The program development system comes with 48K bytes of additional memory for custom-written Fortran programs and expands the system's repertoire of specialized applications or information retrieval schemes, the spokesman said.

Combined with the company's Delta 4300E text-processing CRT terminals, the system suits text-editing and word-processing applications of all kinds, Delta Data said. Other applications include data or order entry, financial information management and small business transactions, the firm added.

The Delta 6500's peripherals interface processor accommodates up to 12 RS-232-compatible hardware devices operating at up to 9,600 bit/sec, Delta Data said. The system's floppy disk unit incorporates up to six drives, each storing up to 242,900 characters of IBM 3740-compatible data.

A basic Delta 6500 system costs $5,950. Delta Data is at Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

Terminet Put On TWX Net

CAMDEN, N.J. — The DE-100 TWX/DDD data set available from RCA Service Co. is said to allow utilization of the high-speed GE Terminet 30 teleprinter on the TWX network as well as in Bell Dataphone applications.

The unit automatically senses and adjusts printer speed to the incoming call (30 char./sec for Dataphone, 10 char./sec for TWX) and meets Federal Communications Commission certification rules.

On a one-year lease basis, the TWX/DDD terminal including the DE-100 data set costs $171/mo from the RCA Service Co., Cherry Hill Offices, Camden, N.J. 08101.

DTS Scanner Eliminates CPU In Back Room

MAYNARD, Mass. — Data Terminal Systems, Inc. (DTS) has unveiled its Model 540 Scan-A-Lone, a free-standing supermarket scanning system.

The Model 540 system offers full Universal Price Code (UPC) slot- and wand-scanning capability without requiring "a complex and expensive back-room computer," according to the company.

DTS estimated a typical Model 540 installation will be approximately 60% of the price of back-room computer-based scanning systems that cost $12,000 to $15,000 per checkout lane, plus installation, maintenance and other costs.

The Model 540 terminal includes a 20-char. display and 23-column dot matrix printer, both of which have full alphanumeric description of items purchased to enhance consumer acceptance of UPC price marking.

With an expanded memory file, the Scan-A-Lone has access to price lookup or stock keeping unit (SKU) code records in selectable amounts up to 15,000, replacing manual entries with scanner input, DTS said.

With the DTS modular design, the Model 300 and 440 electronic cash registers already in the field can be upgraded to Model 540 capabilities, the firm said.

DTS is headquartered in Maynard, Mass. 01754.

WUI Enhances Telex

NEW YORK — International Telex users can now select up to eight overseas numbers at one time with Multi-Call, an option from Western Union International, Inc. (WUI).

To use Multi-Call, a subscriber accesses WUI's international Telex network and enters up to eight overseas selections using the Multi-Call format. WUI then tries each overseas number. When all possible connections have been completed, WUI automatically retries unsuccessful numbers. Multi-Call is available to Telex users at no additional charge. Information on the option is available from local WUI offices.

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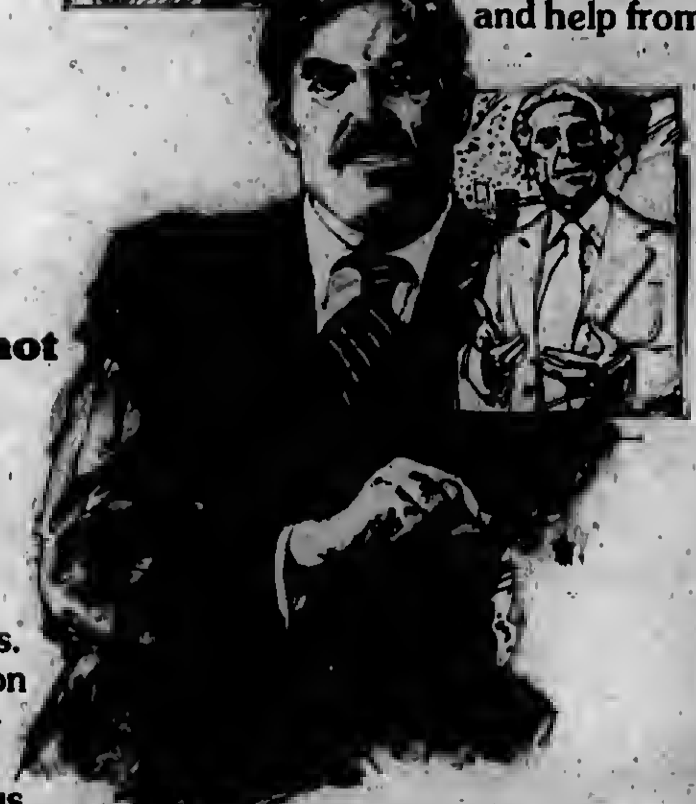

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NEW YORK – The nation's largest social welfare agency is using an IBM 3800 high-speed printer to produce negotiable documents – over one million documents in just 35 hours during a recent test. The Human Resources Administration's use of this printing method, believed to be the first such application in the U.S., is helping this financially plagued city save $13,000 per month in printing authorizations for the purchase of food stamps.

Last June, in a capability test, the city agency printed one million food stamp authorizations in 35 hours for 500,000 recipients, meeting the July 1 deadline of a new federal regulation requiring that two food stamp authorizations be sent out once a month instead of one being mailed twice each month.

"At that time, we were faced with a requirement to print food stamp authorizations which was far beyond the capacity of our installed printers," according to Frank Farnsworth, deputy director of the DP office. "We needed equipment that could print much faster."

However, the agency's decision to change to the IBM printer was not dictated only by the federal rule regarding the food stamp authorizations. For two months the DP office had conducted a study of its printing workload and the types of printers that could help cut operating costs, Farnsworth noted.

"We were thinking in terms of cost benefits as well as increased printing capabilities," he recalled.

If the agency had not chosen the 3800 printer, its alternative would have been to print the negotiable food stamp authorizations on three other printers and hire more people.

"It would have tied up more printers and limited our control of the negotiable documents. We needed to control the continuity of the numbering sequence," Joe Rocco, DP director, pointed out.

Next January, the city agency will install another 3800, retaining one older printer. This final configuration will replace the six conventional printers formerly used by the agency.

Reducing the number of printers from six to three will enable the DP office to greatly increase the quantity of work at a reduced cost, but with no increase in the size of staff, Rocco said.

The food stamp authorization form had to be redesigned to accommodate the optical character reading requirements of banks, where the authorization slips are presented to buy food stamps, as well as the new federal regulation and postal requirements.

Although the new design requires the printing of eight lines compared with the previous four lines, the 3800's printing speed has remained constant; under the previous method, an increase in the number of lines would have increased printing time. Incorporating the latest lineage requirement would therefore have required 140 hours compared with the present 35 hours.

The agency can now print one million food stamps in two days, once a month, saving $156,000 a year on the printing of food stamp authorizations alone.

An added benefit to the city has come with a change in the procurement of preprinted forms. Instead of purchasing all of these forms, the city agency now prints 50 of them on the 3800.

Also, paper costs have been reduced by the elimination of multiple-part paper and DP printouts can be reduced and printed on smaller size paper (8.5- by 12 in.).

"The reduced printouts of the hard copy are clearer and easier to read when done by the 3800," Farnsworth commented. "We definitely save money by doing printouts on smaller sheets."

An example of these savings is the monthly printing of the food stamp rolls. Originally, this involved 28 boxes of standard six-part paper.

In August, the IBM 3800 was used to run six copies of each report – all originals. The printing took the same amount of time as it did with the old six-part form printer.

All copies, since they are originals, have equal legibility, Farnsworth said, and costs were reduced and decollating eliminated.

Installing a second 3800 in January will give the agency a 22,000 line/min capability, compared with its previous 14,000 line/min capability using six printers.

Bits & Pieces

Executives Offered Assertiveness Training

NEW YORK – A course designed to teach the executive to respond to any situation according to personal desires, feelings and interests is being offered by American Management Associations (AMA).

The "Assertiveness for Career and Personal Success" program is an audiocassette/workbook course that presents a series of exercises, self-evaluations and personal inventories as well as self-awareness sessions to develop a person's potential, according to a spokesman.

The course is available to AMA members for $90 and to nonmembers for $100. AMA is at 135 W. 50th St., New York, N.Y. 10020.

Fiche Unit Makes Enlargements

STAMFORD, Conn. – Xerox Corp. has introduced a microfiche reader/printer that it said can produce enlargements from multiple film formats and handle a broad range of microfiche from 24X to 48X reduction.

The Xerox 710 is reportedly capable of producing four 8.5- by 11-in. enlargement/min from a 4- by 6-in. microfiche card containing up to 270 frames of information.

The 740 sells for $3,700 and can be leased for a minimum of $120/mo from Xerox in Stamford, Conn. 06904.

Water Leakage Detector Sensitive to 1/64 of Inch

GREENFIELD, Wis. – A water detection alarm that can reportedly provide an early indication of liquid leakage in computer installations has been introduced by Dorlen Products.

Water Alert provides an alarm in the form of a loud, high-pitched "on-off" sound for up to 24 hours, a flashing light or a telephone call through an automatic dialer, according to a spokesman.

Detection takes place very early, since only a thin film of liquid on the surface monitored by the device will activate the built-in alarm, he added.

The unit "is roughly the shape of a frisbee," the spokesman said. Its diameter measures 6 in. and it weighs approximately 10 oz.

Water Alert is self-contained and operates on a battery with a one-year life span. The sensor on the device can be adjusted to activate the alarm with a water film between 1/64- and 1/8 in., the firm claimed.

The detector is priced from $30 to $80 depending on options such as an automatic phone dialer or a remote indicator.

Dorlen Products, a division of Electro-Consultants, Inc., is located at 7424 W. Layton Ave., Greenfield, Wis. 53220.

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Special to CW

SHORT HILLS, N.J. – When the Chubb Corp. began producing computer output microfilm (COM) for its operations in 1970, its lone application was a loss dictionary of less than 500,000 frames annually. Now the insurance holding company produces more than 42 million frames annually – and it has entered the COM service bureau business.

"The loss dictionary lists every company loss within a given period," David Burnett, a systems analyst, explained. "The report is an important underwriting tool, one we like to check before renewal notices go out. But until 1970, the loss dictionary took so long to print that we were able to issue it only quarterly.

"Mailing the 200 boxes of printout consumed by the report was also costly," he said, adding those costs were trimmed with the switch to COM.

"With an Eastman Kodak Co. KOM-80 microfilmer, we found that we could produce the loss dictionary in a fraction of the time on a more useful monthly basis and mail microfiche copies instead of bulky computer printout," Burnett said.

Since that first project, Chubb's DP and COM departments have grown dramatically. Chubb/COM Services was formed to serve Chubb's own needs as well as outside customers such as banks, industrial accounts and publishing houses.

"This lets us get maximum use from our 150 programmers and a massive bank of computer power," Burnett noted. "By acting as a service bureau for other businesses, we can profit from adapting software and capabilities we've developed for our own use."

In addition to offering DP services, a Chubb computer service sells and maintains software packages for other computer systems. A Chubb school teaches future programmers and systems analysts. And Chubb/COM Services offers users the chance to convert information on their computer tapes to microfilm.

Some clients are insurance companies with applications similar to Chubb. Chubb's principal insurance operations are property/casualty, but also include life and health insurance.

"All of our COM appications involve microfiche," Burnett said. "We issue our loss master print and many other reports on microfiche. This helps us process claims faster, issue corrections and keep track of our losses more efficiently."

For other Chubb customers, especially retailers, computer information is often converted to 16mm microfilm and encoded for automated retrieval.

"Our customers can feed accounts payable documents, checks, statements and personnel records into the computer for immediate use and have the information microfilmed for storage," Burnett pointed out. "Since the firm is coded for automatic retrieval, it can be searched quickly and the desired information usually can be found in seconds.

The Chubb Corp. is profiting two ways from its COM capabilities – through efficient records management and by selling its services to outside companies. Its total COM output has grown from half a million frames per year seven years ago to 3.5 million images a month today.

"For example," he said, "several pharmaceutical companies use Kodak Miracode II retrieval terminals for locating invoices. As invoices are paid, they are grouped by the computer and transferred to 16mm encoded film when they are no longer current."

The manufacturer then can find the invoice at a later date, even if all the information is not available. The date issued, date paid or customer number can be used for lookup. The retrieval terminal will search the film automatically, stopping first at the most recent documents.

When random access is not needed, the edge of the film is "blipped" by the microfilmer with marks which make it possible for retrieval terminals to count the images. When the specific

(Continued on Page 50)

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DMEP-II and Raypack take care of everything else. They provide the X.25 device interface and the Higher Data Link Control (HDLC) line protocol – the international standards used in public packet networks. Plus an operating system that enhances the Emulation Program in your front-end to allow it to perform under both bisynch and HDLC simultaneously. Thus, even when using public packet networks, your other communications networks remain operational.

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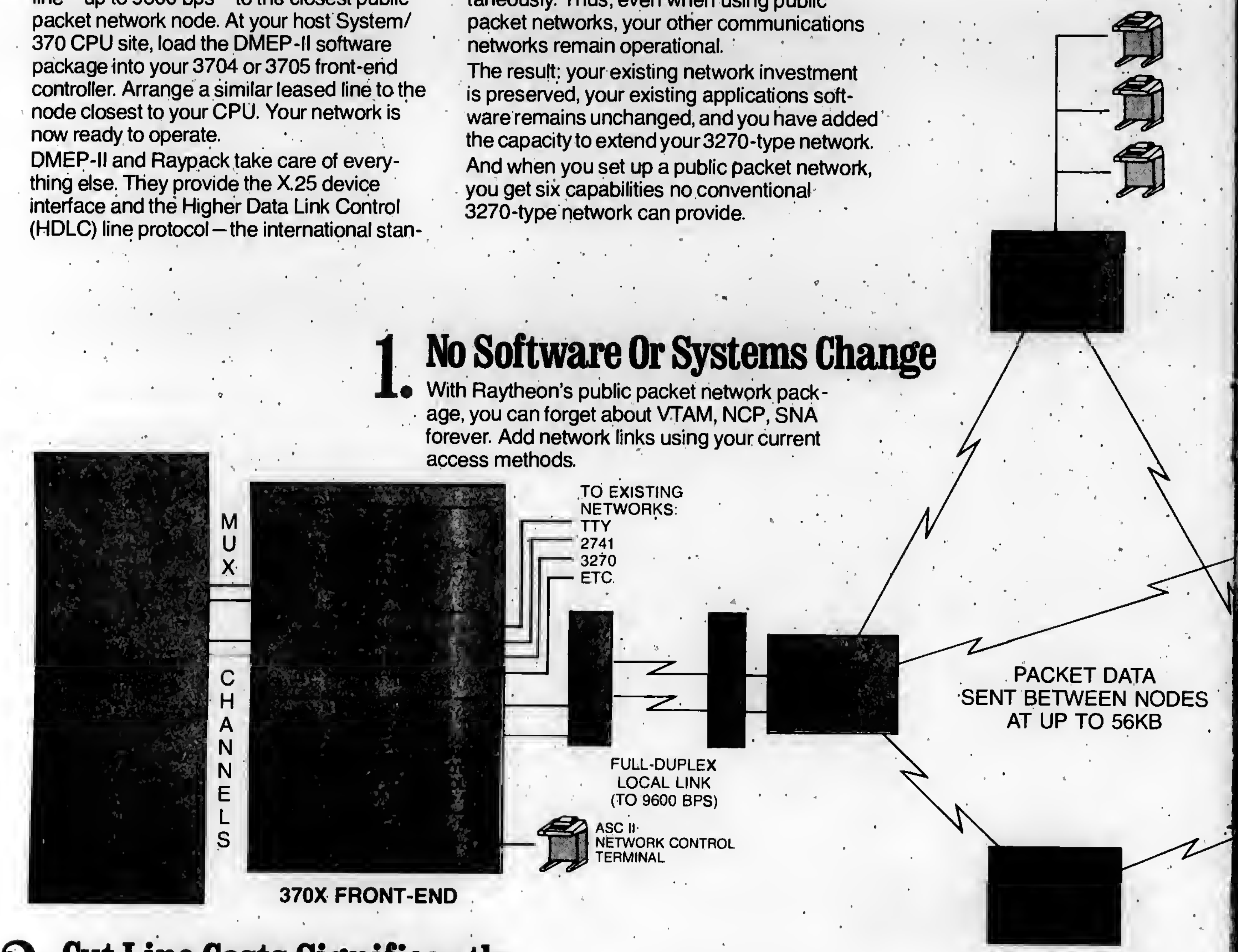
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3. Cut Equipment Costs

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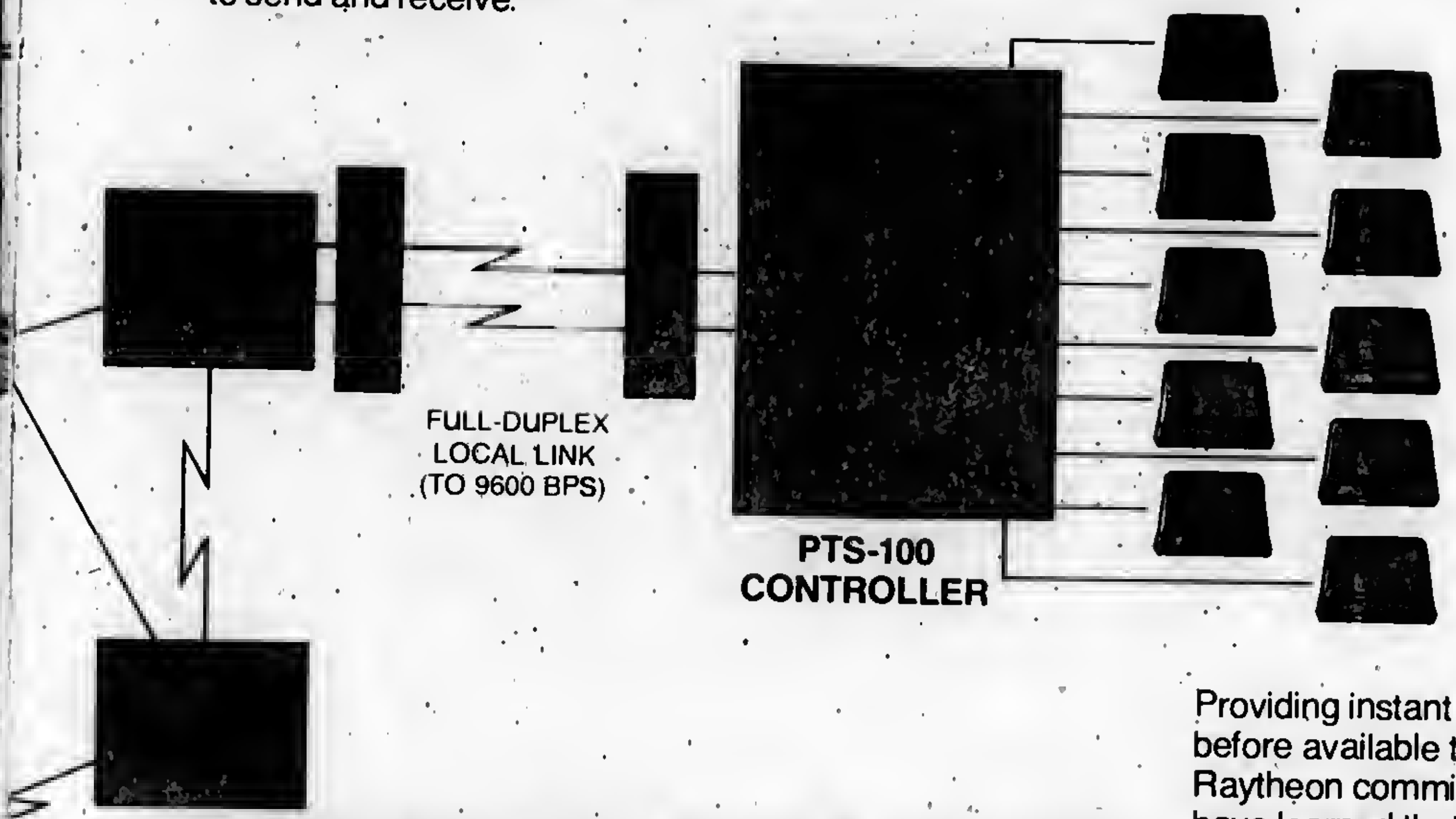

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Problem-Solver Solves Own Problem

Inforex 5000 Keeps Client Data Base Current

Special to CW

WORCESTER, Mass. — Wright line, Inc., a firm that has devoted itself to solving computer-related filing problems, has turned to an Inforex, Inc. System 5000 file management system to help solve its own business development problems.

Wright Line designs, manufactures and distributes specialized filing systems for DP media. Its business development efforts are centered around its catalog ordering programs, with direct mail to over 85,000 customers and prospects.

In order to avoid duplicate mailings, which are quite costly, Wright Line must be able to maintain complete and up-to-date files on its customers and prospects.

The company first tried to maintain its data base in two other ways with an outside service bureau and with an in-house keypunch system. The service bureau posed many problems for the firm, according to Charles Olmstead, VP of administration.

"We had no way of controlling our critical data. The outside bureau maintained the data base and we never knew, for example, whether vital customer and prospect information changes were ever received or entered into the files,"Olmstead said.

"What was worse," he added, "our catalog mailing program was riddled with duplicate mailings, costing the company thousands of dollars a year."

Keypunch Cumbersome

After using the service bureau for a year, the company then maintained its data base with an in-house keypunch system, which was slow and cumbersome, according to Olmstead.

"There was no breakdown of detail in our data, up-to-the-minute validation was impossible and there was no way for us to instantly access the data base. We tended to focus our sales efforts on large computer sites simply because our keypunch system couldn't handle additional volume data input on smaller computer users," he said.

Not only did Wright Line want to reduce duplicate mailings, it also wanted to be able to use the customer/prospect data for a variety of purposes, including identifying high- and low-potential accounts and projecting catalog mailing demand and frequency, as well as maintaining complete mailing, shipping and billing information.

A number of alternatives were considered by the company before selecting the System 5000, including mainframe upgrading and stand-alone minicomputer system.

"This was our first attempt at decentralizing our DP operations. We selected Inforex's System 5000 because of the speed with which it could implement our program," Olmstead said.

"Other vendors couldn't even compete with the start-up speed. Our operators were using the system in just a few days after it was installed. In a matter of weeks, we were up and working," he added.

Data Base Doubled

Since being installed last November, the system has solved many of Wright Line's business development problems, doubling the size of the customer data base, reducing billing errors and reducing duplicate catalog mailings in the process, Olmstead said.

Wright Line's customer data base has increased from 43,000 to over 64,000 names since November, with several hundred customers and prospects being added each week. The company expects to quadruple its data base while using the system.

The disk-based file maintenance system at Wright Line includes two 30 char./sec serial printers, nine CRT terminals, a control unit with 64K bytes of core memory and four 25M-byte disk drives.

In addition to the customer and prospect data base, Wright Line is using the system for a variety of additional applications, including forecasting catalog requirements and advertising program dollars; providing meaningful sales support information regarding prospective accounts, as well as mailing, shipping and billing information; identifying industry/-marketing trends; compiling historical data regarding ordering cycles and company productivity; and determining manpower deployment, quota assignment and industry segmentation.

Compiling All Sites

The company is also using the System 5000 to develop what it hopes will be the most complete listing of computer sites in the U.S. and Canada. This data base is, to a great degree, a key ingredient in the continuing growth of Wright Line, Wayne Clemens, marketing vice-president explained.

"We've purchased several lists of computer sites, and already we've been able to compile a greater number of computer users than all those lists combined. The more computer users we're able to identify, the more data we can compile and, in the end, the more catalogs we can mail out.

"As a result, we anticipate a projected sales volume increase of 25% as a result

(Continued on Page 50)

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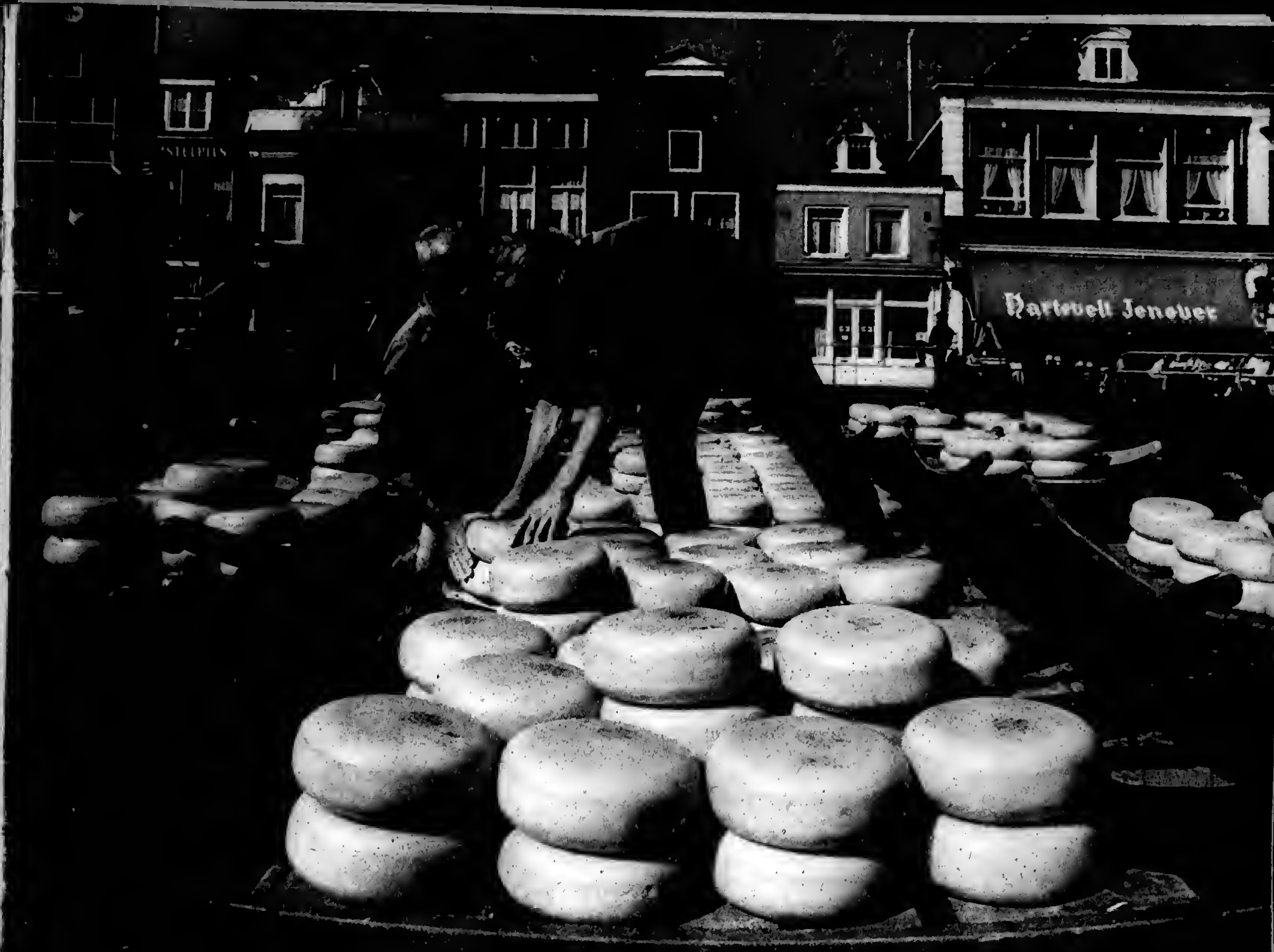

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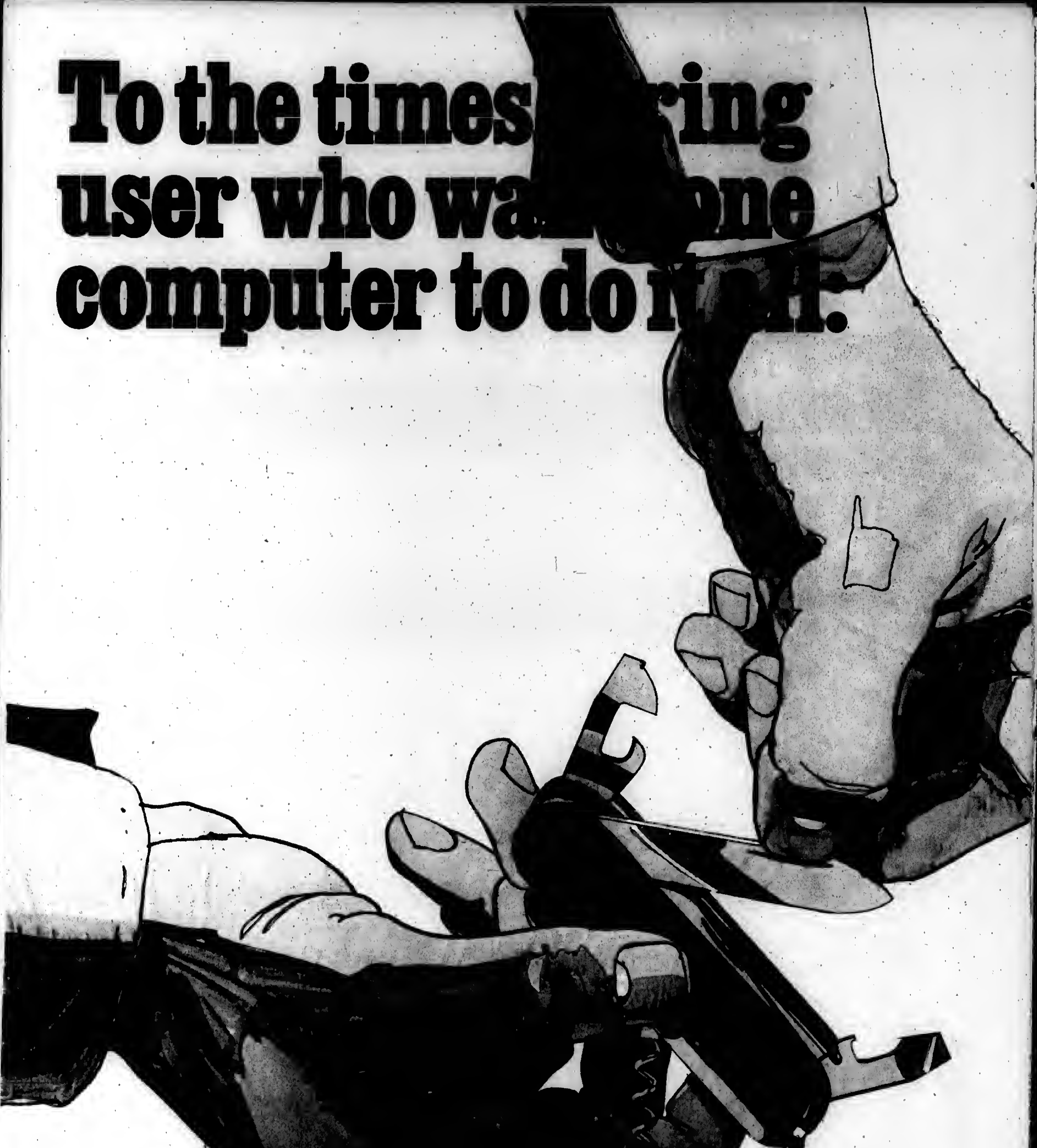

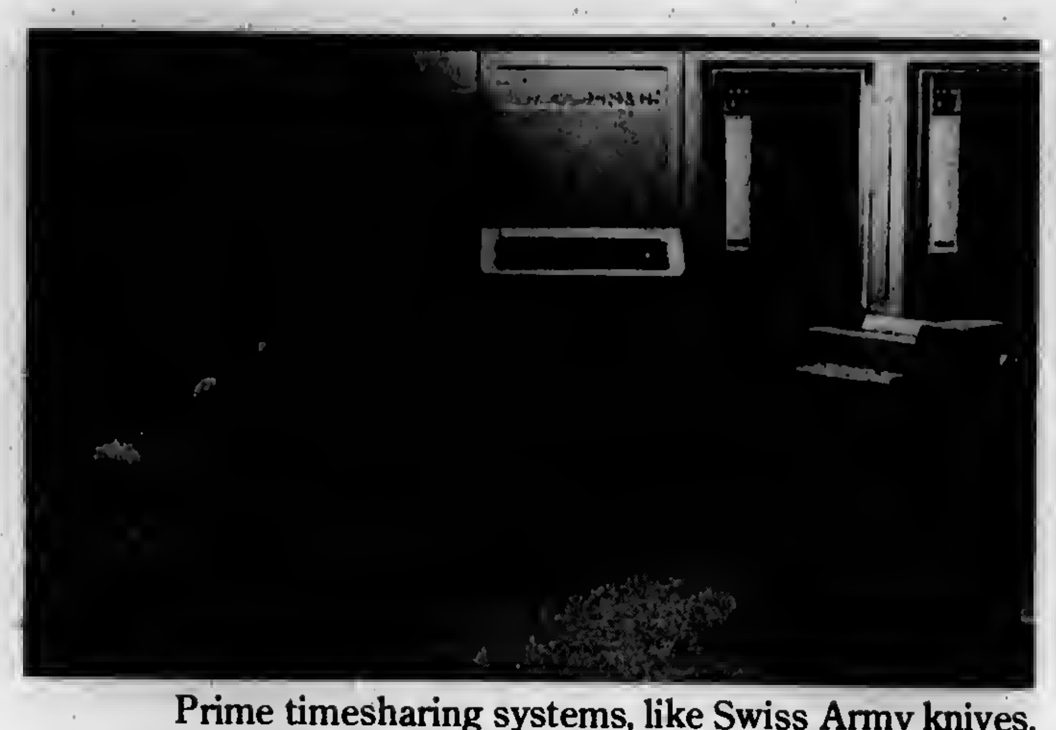

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One Prime computer can do it all: complex simulations in FORTRAN, straightforward calculation in BASIC, text editing, transaction processing, massive number crunching and more.

Typical systems for computational timesharing applications range from $41,000 to $300,000, or about $1,300 to $9,800 per month if leased from and maintained by Prime.

To find out how one Prime computer can do it all for you, contact David R. Johnson, Business Manager, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701, (617) 879-2960.

PRIME

Prime can help

File Management System Keeps Data Current

(Continued from Page 46)

of our comprehensive data base approach," Clemens said.

"We've traditionally been forced to focus our sales effort on large mainframe users, but now we're able to pursue the small business computer market as well," according to Beverly Kilinsky, business development manager.

"Up until now," Kilinsky continued, "we've never been able to break down customer information into smaller, more detailed and usable parts of information. Now, instead of being decentralized in our overall program development, we're centralized, and we're in complete conrol.

"Eliminating outside services and improving our keypunch techniques has finally given us genuine control. Now we know what catalogs are mailed, when, to whom and whether that contract ever received it.

"In addition, the system has helped us improve our credit and returns, has drastically reduced duplicate catalog mailings, has reduced our billing errors substantially and has lessened the paper work workload of our sales force, providing us with up-to-the-minute data when we need it," she said.

The company completed an estimated 70% of its catalog deliveries with the outside service bureau, according to Kilinsky. Now over 90% of its combined main catalog and direct order catalogs are delivered. The reduction of duplicate mailings has saved Wright Line $20,000 to 30,000 annually, she said.

Prior to installing System 5000, the company could only maintain one contact per customer account on the data base. Now up to eight contacts per account can be maintained.

Long-Range Goal

The company's long-range goal, Kilinsky said, is to determine who the buying influence is at each customer and computer site. "The amount of business we do is directly proportionate to the number of people who get their hands on our catalogs. So we went to be sure the right people get them," she said.

The company maintains basic customer data on its IBM 370/125 mainframe, which is used periodically for accounting purposes. All customer data transferred to the host is merely a subset, however, of the Inforex data base.

"Everything is added or subtracted from the 5000 data base," Kilinsky explained. "That's where the real detail is for our custoemrs and prospects.

"We expect a return-on-investment in less than two years," Olmstead added. The 5000 "drastically reduces the time ordinarilly spent in many of the usual development steps, such as systems planning, design, functional specifications and testing.

"It allowed us to plan, design, install, convert from batch and go 'live' with our applications in just weeks, rather than months or years."

"We've already received very quantifiable benefits from its use, and we expect to see continued benefits as more and more applications are developed," Olmstead concluded.

Insurer Enters COM Business

(Continued from Page 43)

microfilm "address" of a desired document is known, the user can find the item in seconds.

Such retreival eliminates the need to retain information indefinitely in the mainframe's memory.

Chubb now has three COM microfilmers: the original Kodak KOM-80 microfilmer plus one additional KOM-80 and one KOM-90 microfilmer. The three units give the company flexibility in the amount and types of tapes it can handle, Burnett said.

"The KOM-90 microfilmer is used only for native-mode tapes — tapes already processed for COM," he explained. "With machine commands and other formatting data included, they can be run through the microfilmer at a very high speed.

"Customers with their own computer systems can change their microfilm format without our intervention by changing their native-mode tapes."

The KOM-80 microfilmers handle print-image tapes (raw tapes formatted only for impact printers). These must be run through one of Chubb's minicomputers before they can be used to produce microfilm.

The minis feed directly to the microfilmers, allowing print-image tapes to be run in sequence, although at a slower speed than on the KOM-90 microfilmer. If the customer desires, the tapes also can be run through one of Chubb's large mainframes and then run on the KOM-90 microfilmer in native mode, but this step is seldom necessary.

"It's a valuable capability, though," Burnett said. "If one or more of our COM units were down, we could run all tapes on the remaining microfilmer. That's another advantage we have over smaller computer services that may not have the equipment we have."

Chubb is currently producing more than 3.5 million COM frames a month. About 25% of that output, or 875,000 frames, is for Chubb's use, while the rest is for service bureau customers.

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BRAEGEN

Mini 'Locks Out' Delinquent Borrowers

By Esther Surden
CW Staff

PHOENIX – Delinquent borrowers are the bane of libraries, but a minicomputer-based turnkey system is helping the public libraries here "lock out" patrons who have overdue books.

Before the system was installed, the libraries used microfilm checkin/checkout procedures. "Patrons were going from branch to branch, checking out books" with their activities only loosely monitored, according to Terry Terrell, computer systems analyst in the City of Phoenix's Management Information Systems Department.

Terrell, along with Juanita Robison, library technical services administrator, researched the field to find the right system to fit the city's needs.

The resulting system has allowed the libraries "for the first time in years" to perform delinquent processing on a current basis. Notices of overdue books previously were mailed out later than they should have been to be effective, Terrell said. The libraries have also saved some manual labor, Robison added, recalling that notices were formerly typed by hand.

Most of the city's 10 libraries are currently on-line; when the remaining ones are brought up, another benefit is expected from the system – a complete book inventory.

Previously, the inventory was incomplete and it was a nearly impossible task to keep track of all the books, Robison said.

Evaluated Its Options

The city evaluated many options before choosing the turnkey system approach, Terrell said. Among those options were putting additional terminals on the city's Honeywell 6000 system. Terrell and Robison eliminated that choice because the mainframe's processing would have been degraded, he said.

Turnkey library systems were examined next. Terrell and Robison looked at one from 3M, one from CL Systems, Inc. (CLSI) and one from a Toronto based company called Universal Library Systems.

"We chose Universal's Ulisys system because it used Digital Equipment Corp. hardware with standard operating software and a standard programming language," Terrell said. The others used a unique language and, in the case of the CLSI system, a unique operating system.

In addition, with the Ulisys system, "we could rely on DEC for hardware maintenance," which Terrell said was a big benefit. Universal was also the low bidder.

Based on a PDP-11/70 running under RSTS/E operating software, the system includes 26 terminals that are distributed among the main library and the nine branches for data base creation and circulation control. The DEC VT50 terminals are used in combination with a scanner pen which reads the bar-coded labels placed in the libraries' books and on patron cards.

In preparation for the system, the bar-coded label was attached to each of the more than 1 million

(Continued on Page 54)

Mini Bits

Three-Day Meet Set for Six Cities

NEW YORK – The uses, economics, programming and implementation of minicomputers are the focus of a three-day seminar to be presented in six cities in the U.S. and Canada next year.

Sponsored by the University of Chicago Center for Continuing Education, the seminar will deal with minicomputers as an extension to or replacement of the central processing department. It will analyze the planning and installation of minicomputers on a stand-alone or decentralized basis, according to a spokesman.

Leading the seminar will be George R. Trimble Jr., president of T-Logic, Inc., a consulting firm. It will be held in Atlanta in January, in Los Angeles In February, in New York in March, Chicago in April, Toronto in May and San Francisco in June.

Attendance costs $435 plus a $60 registration fee which is applicable to the first person of a company who attends. Additional details are available from the New York Management Center, Department 14NR, 360 Lexington Ave., New York, N.Y. 10017.

Topaz Adds Regulators

SAN DIEGO – Topaz Electronics has a series of ac line regulators designed to protect minicomputers and related equipment against brownouts and other voltage fluctuations.

The units feature dynamic regulation and response, operate quietly and are compact for ease of installation and relocation, Topaz claimed. They are offered in power ratings from 600 Va to 1,600 Va.

Prices begin at $360, the firm said from 3855 Ruffin Road, San Diego, Calif. 92123.

Supplies by Mail Offered

HOLMDEL, N.J. – Minicomputer users who need supplies in small volumes can get them from Misco, Inc.

The firm offers a product catalog for mail orders and said it will ship supplies to customers within 24 hours. Products include media storage devices, according to a spokesman.

Misco can be reached through Box 399, Holmdel, N.J. 07733.

PDP-11 Cable Reduced

PALO ALTO, Calif. – Minicomputer Accessories has reduced the price of its Digital Equipment Corp. PDP-11 Unibus cable from $100 for the first 2-ft length and $5 for each additional foot to $100 for the first 2-ft. length and $3.50 for each foot thereafter.

The cable has a bus connector functionally equivalent to the M929 connector on one end and a bus connector equivalent to the M919 on the other end, the company said.

The firm is located at 1015 Corporation Way, Palo Alto, Calif. 94303.

Reality Still Supported, Upgradable to Royale

IRVINE, Calif. – When Microdata Corp. introduced its Royale system [CW, Oct. 31], the question arose of how the announcement would affect present Reality users.

The answer, according to Microdata President Donald W. Fuller, is that the Reality will continue to be supported. Present users, however, have the option of upgrading to the Royale for $2,500, which includes the price of the CPU and the additional firmware. Once the CPU is upgraded, the user can choose to increase disk capacity or memory or add other peripherals as they see fit, he said.

The Reality user's present software investment is protected, Fuller claimed. "You don't have to change a line of code" if it was developed with standard Microdata software, when moving from the Reality to the Royale, he stated.

Several features of the Royale differentiate it from its predecessor, Fuller noted. For example, memory capacity is double that offered on the Reality, increased disk storage can be accommodated and "major parts of the software are moved into hardware."

Applications languages have been moved into firmware, he said, and the method of performing disk I/O has been totally changed to produce improved transfer rates.

In addition, the system can prioritize functions, he said.

The high end of the Royale family uses Reflex disk drives, a product Microdata introduced in June 1976, Fuller noted.

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Newspaper Scoops Savings Via In-House Mini

By Paul J. Zindell
Special to CW

HUDSON, N.Y. – The Hudson Register-Star here, a daily newspaper with a circulation of 13,500 has switched from using a DP service bureau that cost it $18,000 per year to an in-house minicomputer system costing $18,000.

Programming for the Digital Equipment Corp. Datasystem 310 cost another $9,000 for a payback in one and one-half years. No additional labor costs were incurred because each department using the system also provides personnel to input the data. Computer operation and input is eased by the prompting nature of the applications software.

Installed in May 1977, the system supplied by Vision Data Equipment Corp. consists of a PDP-8/A computer drives with 16K bytes of main memory, a VT52 terminal, two floppy disk drives and a 180-char./sec. printer.

Applications software, written in Dibol under the COS-310 operating system, consists of accounts receivable, accounts payable, circulation receivables, circulation mailing lists, payroll, budget analysis and editorial story analysis. A general ledger program is scheduled to be installed soon.

Accounts receivable programs produce daily sales and payment journals, daily and monthly space summaries and monthly aged-trial-balance reports by alphabet, salesman, geographic area and type of account.

The system is capable of printing 800 itemized monthly bills in three hours. It also produces delinquent account lists broken down by over-30, over-60 and over-90 days, with telephone numbers to facilitate solicitation. All of these reports and the invoices result from an input time of one hour per day.

Payables Run Weekly

Accounts payable programs are run weekly and produce a check register and print vendor checks. The payables are also run against the budget to produce a monthly budget analysis broken down by category within the various newspaper departments. Input time for the payables is approximately two hours per week.

Circulation programs produce a daily cash transaction report, weekly collection reports by route, aged weekly bills for carriers and vendors, weekly ledgers by zone and by town to conform to Audit Bureau of Circulation requirements, weekly aging report and a draw list for the following week.

Daily bundle labels showing the driver, carrier and number of papers are also printed. The carrier programs allow for temporary starts and stops and individual mailing labels are printed presorted by Zip Code.

Automatically Billed

Mail subscribers are automatically billed prior to their expiration date and subscriptions are extended accordingly. Circulation input time amounts to less than one hour per day.

All required payroll reports, including W2 and 941 forms, are produced by the payroll programs. Payment is optional by check and/or cash and a weekly cash breakdown is provided. Input time for 75 employees is approximately one-half hour weekly.

The editorial program keeps track of each reporter's daily story count and average count month-to-date and year-to-date. Also provided are totals and averages for the entire department daily, month-to-date and year-to-date. Input time is less than five minutes per day.

Zindell is production manager for the Hudson Register-Star, Hudson, N.Y.

Vendor, User Visits Key to Paper's Search

By Esther Surden
CW Staff

HUDSON, N.Y. — When the Hudson Register-Star here decided to bring its DP inhouse it conducted a year-long investigation of small business systems,, according to Paul J. Zindell, production manager. The investigation included four weeks of visits to installations both at user sites and vendor offices, he noted.

"We were looking for a system that cost less than $50,000," Zindell explained. At that price, the newspaper would receive a three-year payback on the system when comparing that cost with the projected service bureau costs.

Zindell was knowledgeable about computers before he made the search. "It's always been a hobby of mine and for the two years preceding [the investigation] I went back to school at night" to pick up computer courses.

Contacted Vendors

With this up-to-date background in programming, Zindell contacted the 14 companies involved in the search.

The salespeople, he found, "would assume you didn't know" much and "practiced outright deception," he charged.

The systems considered included those from Basic/Four Corp., Burroughs Corp,, Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., Honeywell Information Systems, IBM, Microdata Corp., NCR Corp., Olivetti Corp. of America, Singer Business Machines, Texas Instruments, Inc. and Wang Laboratories, Inc.

Several of the manufacturers were not visited, he reported.

For example, the HIS Level 6 systems, which were in the right price range, had only recently been announced and HIS did not provide supporting software.

Hewlett-Packard's prices started at $99,000 "for anything other than a sophisticated calculator." The Olivetti had "no area outlets with demonstration capabilities."

"We eliminated IBM first," Zindell noted. According to the report issued, IBM had a "maintenance charge on software which we feel is exorbitant. In addition (it had) no CRT for inputting data." NCR was also eliminated because of its maintenance charge.

Philips was "more a ledger card system than a computer" and along with Burroughs had no CRT for data input. The Basic/Four and Microdata systems did not have local service or software support, he added.

Wang's policy of separate hardware and software vendors, the production manager said, "opens the policy of dispute over reponsibilities after installation.

DG lacked proven applications programs, the report noted. This left Digital Equipment Corp. as the final choice.

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Typeset Options Extended

PLAINVIEW, N.Y. — Three modular, on-line microcomputer-based systems designed for commercial, inplant and newspaper type-setting applications are available from Varisystems.

The systems use a distributed approach, with microcomputers of the company's own design distributed throughout the system, a spokesman explained.

The three products include the Varicomposer Multiterminal Systems (MTS) for high-speed information processing and editing, the Varicomposer 1A, a single-CRT system that interfaces up to three floppy disk drives; and the Varicomposer Data Gathering System, designed to input to the Varicomposer 1A or the MTS from simultaneously operating work stations.

The basic MTS, which includes two CRTs, five floppy drives and a multiplexer, costs $32,120. The Varicomposer 1A costs $13,340.

The Data Gathering System, which permits input from up to 10 CRTs and interfaces the CRTs to a single processor and two floppy drives, is priced at $30,470, the company said from 80 Skyline Drive, Plainview, N.Y. 11803.

Doctors Get Turnkey

PHOENIX — An on-line, real-time turnkey medical management system designed for both doctors and dentists is available from Escom Arizona.

Based on Microdata Reality equipment, the system is structured to accomplish 12 major tasks for the professions.

They are patient and responsible party registration; transaction processing; billing and insurance claim form processing; inquiry; report generation; file maintenance; report printing; security/password control; file backup; microfiche formatting; patient scheduling; and medication control.

A typical system including 32K of core, a 10M-byte disk drive, 800 bit/in. tape, 300 line/min printer, four CRTs and the software costs $72,405.

That price includes training, documentation, preprinted forms and conversion assistance. Hardware maintenance is furnished by Microdata. Escom Arizona is at Suite 400, Building B, Phoenix, Ariz. 85034.

Calma Turnkey Gives Graphics

SUNNYVALE, Calif. — Calma's Graphic Data System II (GDS II) is a turnkey minicomputer-based system developed to provide a solution to the problems of design, documentation and artwork generation, according to a spokesman.

The system features 32-bit integer coordinate precision, data bases that accommodate both graphics and non-graphics information and a command language that can be used by both novice and experienced users.

A GDS II system includes a Data General Corp. Eclipse S/230 CPU, 12.5M-word removable disk pack, magnetic tape and a system console. Design stations, plotters and as many as six CRTs can be added to the system.

Users who have the advanced version of the GSD I system which uses an Eclipse CPU can upgrade to the GDS II for $10,000, the spokesman noted.

A typical system with 80K core memory, magnetic tape drive, disk drive, Digital Equipment Corp. Decwriter, dual 19-in. CRT with constrained cursor, California Computer Products, Inc. 960 plotter and floating-point board costs $250,000.

Calma is at 707 Kifer Road, Sunnyvale, Calif. 94086.

DEC Disk Subsystem Fits PDP-11, VAX-11

MAYNARD, Mass. — Digital Equipment Corp. has introduced two large-capacity disk drive subsystems for use with the PDP-11/70 as well as the recently introduced VAX-11/780 [CW, Oct. 31].

The disk subsystems use the RM03 disk drive and include controllers to allow the drive to be attached to the minis, DEC said.

The RMO3 drive handles 67M bytes of storage; a single subsystem can be expanded to 536M bytes of on-line formatted capacity, a spokesman said..

The subsystem features data protection and diagnostic software. Average access time is 38 msec and data is transferred at 1.2M byte/sec, DEC said.

A one-drive subsystem costs $25,000; an add-on disk drive costs $19,000, DEC said from Maynard, Mass. 01754.

Serial Printer, Teleprinter Added By Decision Data

HORSHAM, Pa. — Decision Data Computer Corp. has introduced a printer terminal and a serial printer for minicomputers.

Forms can be moved both forward and in reverse in partial line increments, Decision Data said. This reportedly allows the units to print business graphs, charts and mathematical expressions.

The printers have a 96-character set of symbols and a print line of 132 positions. Both require an RS-232-C interface.

The Model 3240 printer terminal sells for $2,850 and the Model 6540 is priced at $2,395. Decision Data is at 1C0 Witmer Road, Horsham, Pa. 19044.

Cabinet With Fan Holds 300 Disks

PALO ALTO, Calif. — A disk cabinet with a "clean room" package is available from Minicomputer Accessories.

The storage system includes a two-drawer cabinet, filter and fan. It can hold up to 300 floppy disks.

The fan circulates cleaned air through the cabinet, forcing out dust and dirt, the company claimed. When a drawer is opened the rush of clean air out of the cabinet prevents dust from settling on the contents.

The cabinet costs $295 plus shipping and applicable sales taxes, the firm said from 1015 Corporation Way, P.O. Box 10056, Palo Alto, Calif. 94303.

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Keeps Membership Data Up-to-Date

Mini Helps Industry Group Flow Smoothly

By Esther Surden
CW Staff

DENVER — Every industry has an association whose mandate is to keep membership up-to-date on issues concerning its specialty. But just keeping track of the membership has become an increasingly complex problem as associations grow and add functions,

One such organization the American Water Works Association here, is keeping track of more than 26,000 members using an on-line minicomputer system.

Founded in 1881, the association is dedicated to improving both the quality and quantity of water available, according to Ralph Uhlenburg, director of administration. When the present water crisis increased the demand for the organization's services, it turned to a service bureau.

But that soon became inadequate "We were faced with continuously rising costs," Uhlenburg recalled, "and we wanted an on-line system."

The service bureau updated the membership lists monthly while the organization prepared labels daily, and "sometimes we were issuing incorrect labels," he said.

The association decided to study inhouse DP systems. Uhlenburg received quotations from 16 different vendors and service bureaus and then contracted with a consultant to come up with an independent recommendation.

Both the consultant and Uhlenburg arrived at the same conclusion — that the Microdata Corp. Reality system with software written by a local vendor would be the best solution.

The major reasons for choosing the system were its ability to fit into an office environment, its on-line capability and its ability to acommodate variable-length records, Uhlenburg said.

The association had been locked into fixed-length records on the service bureau's IBM 360 system, he explained.

Preparing three labels for various publications is one of the system's major tasks, along with keeping tabs on the payment of dues, address changes and other roster information. In addition, the system tracks orders and invoices for the publications.

Speeds Cash Application

"We are able to process our cash application in one day; it formerly took a week," Uhlenburg said. The system also enabled the organization to reduce personnel by one person.

The system has 24K of core memory, a 10M-byte disk drive, a 300 line/min printer and two CRT terminals. The software was developed by Electronic Systems of Colorado, customized to the association's application, and "we wouldn't have it any other way," Uhlenburg said.

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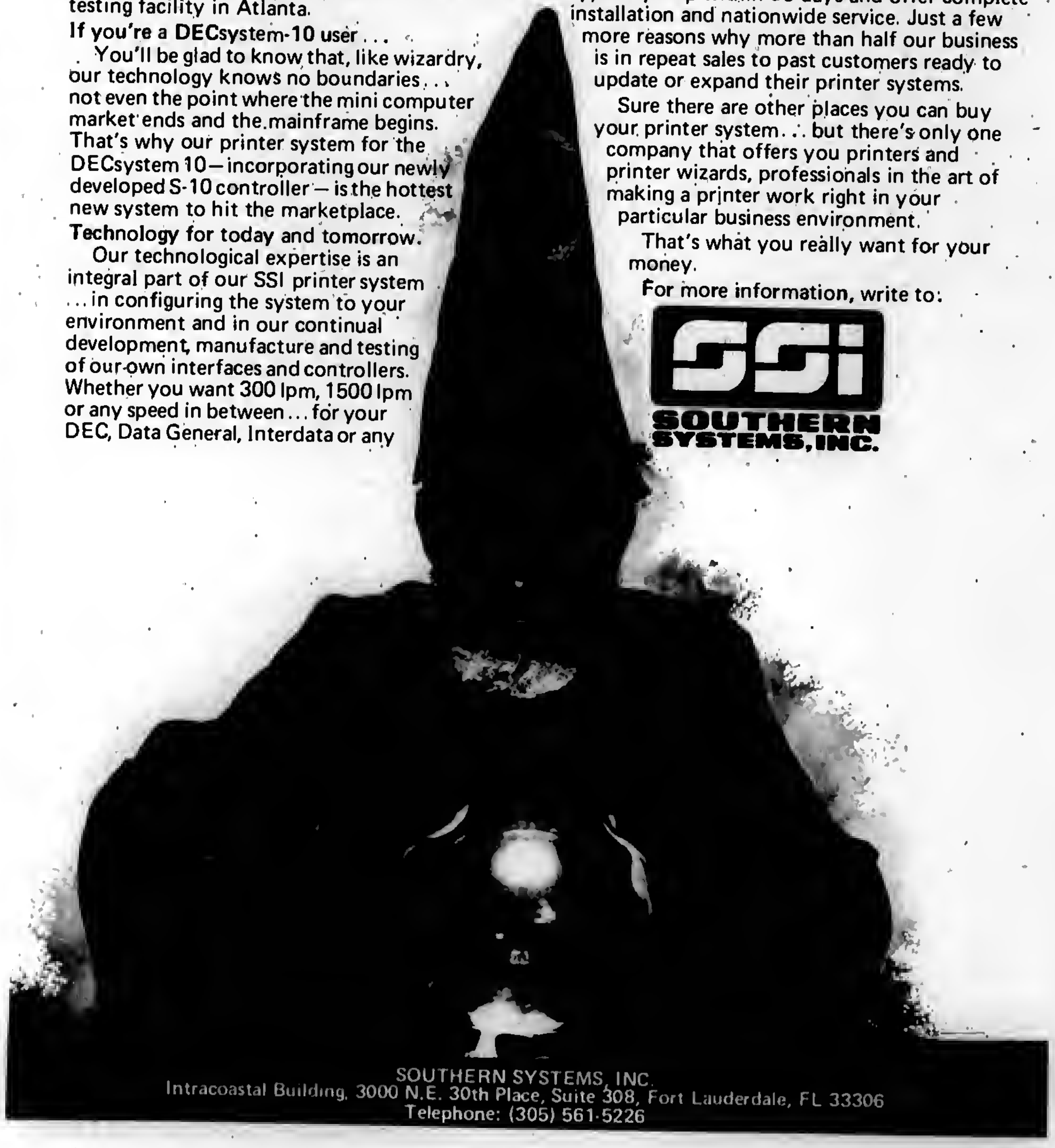

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Ampex Add-On Fits DG, DCC

EL SEGUNDO, Calif. — Ampex Corp. has an add-on memory designed for users of Data General Corp. and Digital Computer Controls, Inc. (DCC) equipment.

The ARM-1280 provides 16K words of memory and is reportedly pin-compatible with all Nova 800 and 1200 and DCC D116H and D116S minis.

Selectable Speed

Memory cycle speed is switch-selectable to match the performance requirements of each of the models, Ampex said. Cycle time is 800 nsec, for the Nova 800, 1,200 nsec for the Nova 1200 and DCC D116S and 960 nsec for the DCC D116H.

Contained on a single board, the unit can be plugged into any memory slot and will operate in any address field up to the maximum addressable field in any of the models, according to the vendor.

The ARM-1280 costs $1,725 from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

Mini Locks Out Tardy Borrowers

(Continued from Page 51)

library books in the various branches. This was primarily a library personnel effort, Terrell said, and resulted in the development of the library data base.

No DP Personnel

The system performs a number of functions for the libraries, all without the help of DP personnel. Aside from checking the books in and out, it prepares overdue notices on a daily basis and alerts the terminal operator when a book placed on reserve is checked in.

That night a notice that the book is in the library is mailed to the patron who requested it.

The operator is also alerted when a patron with an overdue book tries to take out another book. This effectively "locks out" delinquent borrowers.

All of the functions the system performs contribute to the statistical reports that are issued on a daily and a monthly basis. The reports are produced off-line.

Micro Bytes

LSI-11 Types Gain Wire-Wrap Boards

SAN CARLOS, Calif. — Artec Electronics, Inc. has introduced two wire-wrap printed circuit (PC) boards for users who want to build their own Digital Equipment Corp. LSI-11-type I/O and memory systems, according to a spokesman.

The full-size board, totally uncommitted and designed for the insertion of wire-wrap pins, can accommodate approximately 130 standard 14-pin and 16-pin dual-in-line packages (DIP) plus passive components.

Artec's half-size version, 5.225 in. wide by 8.4 in. high, sells for $35. The full-size version, 10,45 in. wide by 8.4 in. high, costs $75 from the firm at 605 Old County Road, San Carlos, Calif. 94070.

Cassettes Protected

WALLINGFORD, Conn. — Certified digital cassettes that are designed for use on home computers have been announced by Good Image, Inc.

Each cassette contains 290 ft of tape that is certified at 800 bit/in. and is labeled, boxed and sealed for environmental protection, according to a spokesman.

The cassettes sell for $4.79 each from Good Image, 412 South Cherry St., Wallingford, Conn. 06492.

Micro, Phones Linked

LAFAYETTE, Ind. — A module that permits bidirectional communications between a microprocessor and the telephone system was announced by the Wintek Corp.

The Wince Touch-Tone Transmit/Receive Module can be used in such applications as automatic telephone dialing/-receiving, automatic credit card verification, point-of-sale terminals and mobile radio telephone systems.

It is available on a 44-pin printed circuit board for $1,499 from Wintek at 902 N. 9th St., Lafayette, Ind. 47904.

Prom Matrix in Kit

MAMARONECK, N.Y. — A programmable read-only memory (Prom) matrix kit has been introduced by the Sealectro Corp.

The board comes with 10 diode pins to provide "simple" byte programming with visual readouts by means of a pin display, according to the vendor.

The Prom matrix kit sells for $37.50. Sealectro is in Mamaroneck, N.Y. 10543.

Correction

One- through four-year lease rates on the Texas Instruments, Inc. Model 810 microprocessor controlled printer [CW, Nov. 7] were reduced $15/mo.

Hobby Fest Set for NCC . . .

MONTVALE, N.J. — A Personal Computing Festival will be featured June 6-8 at the 1978 National Computer Conference, scheduled for the Disneyland hotel complex in Anaheim, Calif.

Hobbyists, consumers, students and computer professionals are invited to participate in the festival, which will include exhibits of personal computing products and services, a program of papers and presentations and a display of individually designed personal computing systems and applications.

Approximately 30 sessions are planned as part of the festival. They will cover such topics as graphics, music systems, speech synthesis, computer games, computers for the physically handicapped, software design, optical scanning and floppy disk systems.

The Festival Program Committee will review and select papers from those submitted for consideration. These papers and presentations will be gathered in a soft-bound volume, *Festival Digest '78*, which will be available during the festival.

Prizes will be awarded for the most innovative hardware and software systems and applications. These will also be on display throughout the festival.

A portion of NCC's professional program and the professional development series will concentrate on subjects closely related to personal computing. The primary intent of these presentations will be to bring those in the computing field up-to-date on personal computing and its future direction, organizers said.

Both one-day and three-day registrations are available for the conference. Additional information is available from the NCC sponsor, the American Federation of Information Processing Societies, Inc., at 210 Summit Ave., Montvale, N.J. 07645.

. . . Papers Sought

MONTVALE, N.J. — A call for papers — and session chairmen — has been issued for the Personal Computing Festival to be held in conjunction with the 1978 National Computer Conference June 5-8 in Anaheim, Calif.

Included as part of the three-day program that will begin one day after NCC opens will be presentations of invited papers, contributed papers and tutorials, as well as panel discussions relevant to personal computing.

Approximately 30 sessions are planned for the festival, acording to Jim C. Warren, chairman of the program.

Emphasis will be on tutorials for computer novices, speech synthesis and recognition, computer-driven and assisted music systems, computer graphics and art, personal computers for the physically disabled, computers for education, business systems using "home" computers, hardware and software design and computer implementation.

Papers and session proposals on other topics are also encouraged, Warren noted.

Potential authors should send a "letter of intent" including an abstract of their proposed topics to Warren as soon as possible. They will then be mailed the Festival Author Kit, which contains instructions and materials for preparing camera-ready copy.

People interested in chairing sessions should submit by Feb. 1 two copies of a 250-word abstract describing the scope of their proposed sessions and a tentative title of presentations to Warren at Star Route, Box 111,

(Continued on Page 58)

TDL Makes Four Offerings

PRINCETON, N.J. — Four products — a data base management system (DBMS), a text-editing language, a video interface board for S-100 micros and a wiring accessory for its own System Monitor Board (SMB) — have been introduced by Technical Design Labs, Inc. (TDL).

Micro-Seed, DBMS designed to operate on TDL's Xitan Z80 microcomputer, will support both hierarchical and network data structures, providing both schema and subschema views, TDL said.

The package consists of a data definition language processor that checks and compiles the data definition into a schema table; data manipulation language subroutines that can be invoked from Fortran or Assembly language programs to retrieve and update the data base; and a data base initialization program that prepares a disk area for the loading of a data base, according to a spokesman.

Micro-Seed is applicable to any situation that involves working with data in the hobby, scientific or commercial fields, TDL said. The price of the package, which requires the TDL Z80 disk system configuration and an additional 48K of memory, is $1,250.

The Z80 Text-Editing Language (Z-Tel) software is a utility program that provides a set of techniques for manipulating and editing text files, TDL said. It was designed for the user who requires absolute control over his text environment, the spokesman noted.

Some features of Z-Tel include the ability to move large blocks of text around inside the buffer; the ability to write macro expressions which become actual text-editing programs; an expression evaluation capability; and branching and conditional branching commands within the text-editing structure, TDL said.

A read-only memory program that requires less than 7K Z-Tel is available for $50 on paper tape and for $40 on cassette.

The Video Display Board (VDB) S-100 bus microcomputers consists of two boards joined "piggyback" style; only one acts as a connector on the bus, the spokesman said.

The VDB contains its own display buffer memory and provides two pages of display, each with 25 rows of 80 characters, he added.

It also features 96 upper/lower case Ascii characters with descenders and 64 unique symbols, permitting a graphic resolution of 160 horizontal elements by 75 vertical elements. The display can accept data at 400,000 char./-sec, TDL said.

The VDB does not require a high-resolution monitor but can work with a modified television set or available video monitor. It is priced at $349 in kit form and $499 assembled.

Interface One

The final product introduced, Interface One, is a "plug-in" connection that eliminates the necessity of hand-wiring the 26 wires of the SMB ribbon cable to its I/O devices, TDL said.

Interface One consists of a PC board into which are soldered three female DB25 connectors and one male flat ribbon connector. The module is also accompanied by a ribbon cable with female connectors on both ends.

The module includes an 18-in. length of ribbon cable with molded connectors on each end to connect the Interface One to the SMB. Both serial I/O ports (teletypewriter and video) of the SMB as well as the parallel port lines are each brought to a separate connector.

The board can be mounted to the inside back of the Xitan computer system or any other cabinet that will accept three DB25 connectors on 1-in. centers, the spokesman noted.

The price of the interface, with all necessary mounting hardware, is $27 in kit form and $40 assembled and tested. TDL is located at Building H, Research Park, 1101 State Road, Princeton, N.J. 08540.

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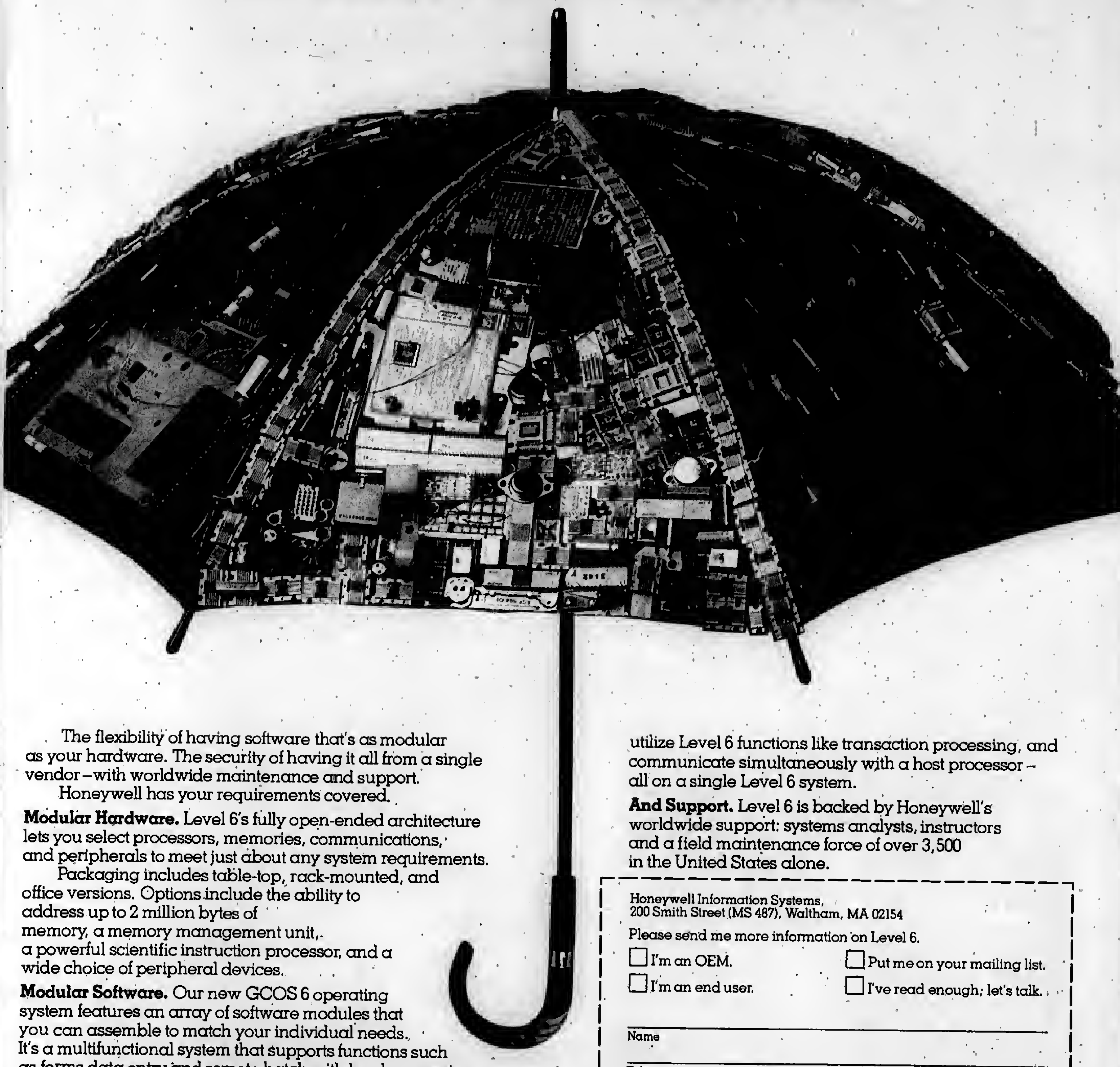

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COMPUTERWORLD
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B

bit — 1. Bit is an abbreviation for binary digit. Most commonly a unit of information equalling one binary decision, or the designation of one or two possible and equally likely values or states, usually conveyed as 1 or 0 of anything used to store or convey information such as 1 or 0, which may also mean "yes" or "no." 2. A single character in a binary number. 3. A single pulse in a group of pulses. 4. A unit of information capacity of a storage device. The capacity in bits in the logarithm to the base two of the number of possible states of the device.

bit slice microprocessor — The bit-slice microprocessor represents a new class of semiconductor device for computers. Bit-slice circuits are being produced in Schottky-TTL form by many companies. One of the first was Intel's 3000 series chip, two bits wide, but other manufacturers are offering slices four bits wide. Some are building chips with integrated injection logic (I^2L), and others are building chips of emitter-coupled logic (ECL).

blocks — Records are transferred to and from tapes in the form of blocks (sometimes called physical records). A block (physical record) may contain one or more records (logical). Records may be reduced to blocks on tape to reduce the acceleration and deceleration time.

Boolean algebra — A mathematical system of logic named after George Boole, English mathematician and logician. It deals with classes, propositions, on-off circuit elements, etc. Associated by operators as AND, OR, NOT, EXCEPT, IF . . . THEN . . . which permits computations and demonstrations as in any other mathematical system.

bootstrap — 1. A technique or device designed to bring itself into a desired state by means of its own action, e.g., a machine routine whose first few instructions are sufficient to bring the rest of itself into the computer from an input device. 2. To use a bootstrap. 3. That part of a computer program used to establish another version of the computer program.

branch instructions — An instruction logic which when executed may cause the arithmetic logic unit (ALU) to obtain the next instruction from some location other than the next sequential location. A branch is one of two types: conditional, unconditional.

breadboard — Usually refers to an experimental or rough construction model of a process, device or construction.

break — Can refer to either an open circuit or an interruption in transmission to allow transmission from the other end.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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In New York, Anaheim

'Impact' Seminars Scheduled for Both Coasts

NEW YORK — A one-day conference on "The Impact of Personal Computers," sponsored by The Yankee Group, a consulting firm, will be held in New York City on Dec. 6 and in Anaheim, Calif., on Dec. 9.

Four speakers will address topics of personal computing organized under eight headings: "The Effect on the Small Business Computer Market," "The Effect on the Sophisticated Programmable Calculator Market," "The Development of a Home Market," "Technology," "Applications,' "Markets," "Communications" and "Impact: Future."

The featured speakers are Alan Kaplan, Dr. Portia Isaacson, Carol Ogdin and Howard Anderson.

Kaplan has researched "the effects of emerging semi-conductor technology into personal computers."

Isaacson, who is involved in the ownership and management of several retail computer stores, is president of the Comptuer Stores Retailer Association. She organized this year's National Computer Conference symposium on personal computing.

Ogdin, technical director of Software Technique, Inc., has reseatched minicomputer design and applications. Anderson, president of The Yankee Group, is a past speaker at Yankee Group seminars on data communications topics.

"The first impact of personal computing will be on the small business computer," according to a spokesman for The Yankee Group. "A substantial part of this market will be stolen by an upward migration from personal computing.

"The second impact of personal computing will be on the home market ... Home computers are an upward migration from programmable calculators.

"The third impact of personal computing will be on communications. The first thrust will come from personal business computers with a need to exchange information.

"The second may come from innovative electronic mail delivery systems and true dispersed processing applications," the spokesman said.

The registration fee for the conference is $300; the fee is $250 each for additional attendees from the same company. The fee includes attendance at all sessions of the conference, "The Yankee Group Research Manual" and lunches.

The Yankee Group's mailing address is P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

Space Byte 8085 Debuts

LOS ANGELES — A microprocessing unit (MPU) with full I/O capabilities and 256 bytes of random-access memory (RAM) has been introduced by the Space Byte Corp.

The Space Byte 8085 features two RS-232C serial I/O ports, one for a CRT and the other for a printer. Both have software-selectable transmission rates, the firm said.

The 8085 operates at 3 MHz, uses a 450 nsec memory and is fully compatible with all 8080 software, a spokesman claimed. It also has a 1.302 microsec minimum instruction cycle time, he added.

This MPU card, containing an S-100 bus, provides all the facilities necessary for operating a disk system, console CRT or high-speed serial printer, Space Byte said.

The MPU is delivered complete with tape and disk software resident in programmable read-only memory, four vectored interrupts and a programmable 14-bit binary timer/counter.

The price of the unit, which can reportedly serve as the heart of its own software development system, is $499. Space Byte is at Suite 201, 1720 Pontius Ave., Los Angeles, Calif. 90025.

Papers Sought for NCC

(Continued from Page 55)

Redwood City, Calif. 94062.

In the case of panel sessions, a potential organizer should list proposed panelists, their titles and affiliations and a brief biography of each speaker.

Applicants will be notified on the disposition of suggested sessions by Feb. 10.

Papers that are presented during the festival will be published in a softbound book, *Festival Digest '78*, which will be available during NCC.

Information concerning the festival or NCC in general can be obtained from the sponsor, the American Federation of Information Processing Societies, Inc., 210 Summit Ave., Montvale, N.J. 07645.

NEC Aids Users

LEXINGTON, Mass. — NEC Microcomputers, Inc. has published documentation for its UPD371 magnetic tape cassette/cartridge controller, according to a spokesman.

The 58-page users manual provides a product description, including timing and circuit diagrams.

The manual costs $10 from NEC at 5 Militia Drive, Lexington, Mass. 02173.

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McAdams' Figures Show

IBM Stunted Tape, Disk Makers' Growth

By Catherine Arnst
CW Staff

NEW YORK — IBM's success in impacting the growth of disk and tape drive manufacturers can be seen by studying the market shares for those products, according to testimony by Dr. Alan McAdams, the government's chief economist, at the U.S. vs. IBM trial here.

IBM had 70% of the tape drives installed domestically on IBM systems and 72.7% of the disk spindles as of 1975, according to charts developed by McAdams and two of his staff members, Richard Baeyen and Charles Osborn, for the trial.

The firm's market share of tape and disk drives corresponded closely to its share of the computer market, which was 72.2% in 1972, according to other McAdams charts [CW, Nov. 7].

Consequently, even though the economist only measured tape and disk drives installed on IBM computer systems, those systems make up the bulk of the market, by his calculations.

With disk spindles, McAdams developed percentage figures for the IBM 2311, 2314/-2319, 3330 and 3340-type disk drives for the years 1970 through 1975. The percentage plug-compatible manufacturers (PCM) had for each of these models got smaller as IBM introduced newer products.

In the disk drive market, PCMs gained a larger share of the market until 1972, when their growth leveled off, according to the charts. In August 1972, IBM made its "smash" announcement (so-called by internal IBM documents), which bundled the control unit for the disk drive with the CPU on the 370/158 and 168, as well as several other price cuts and interface changes.

These design changes were made to lock out competitors from the disk market and so were predatory actions, McAdams claimed.

Prior to Smash, IBM's market share dropped 19.3% between 1970 and 1972. It had 92.3% of the installed base in 1970 and 77% in 1972. Between 1972 and 1974; however, the firm's share dropped only .7%, to 76.3%. In 1975, the PCMs did make some inroads into the 3330 disk-type market (increasing their share from 19.1% in 1974 to 26.7%, which caused IBM's overall share to drop 3.6% to 72.7% in 1975.

Tape Drive Arena

In the tape drive market, McAdams looked at the market share of IBM 729, 240X, 2420 and 2320-type tape drives for the years 1967 through 1975.

In a graph developed by McAdams' staff depicting the market share of IBM, Potter, Telex, Storage Technology Corp. (STC), Control Data Corp. and "others" all the PCMs showed very moderate rates of rise or decline except STC. This firm's share rose from zero in 1970 to 15.7% in 1975, whereas no other firm's share ever rose to more than 7%.

However, STC was never a great financial success, according to the testimony of Jesse Aweida, a cofounder [CW, May 30].

IBM's share of the installed base of tape drives has dropped steadily since 1967, when it had 99.3% of the market. The greatest loss was experienced between 1968 and 1971 when its share dropped at an average rate of about 5% a year. In 1970, IBM announced the 3420, which was similar to the 2420 but lower in price.

Series/1 Sales Seen Moving Through OEMs to End Users

By E. Drake Lundell Jr.
CW Staff

ATLANTA — Apparently even IBM has to go through the normal growth cycle in the minicomputer "iron" marketplace, according to its experiences in the first year of marketing the Series/1 mini.

In this cycle, firms generally do most of their initial business with OEMs and systems houses, then add improvements that make the product more appealing to end users with a resulting increase in end-user business.

And that's just about what is happening to IBM, according to Robert M. Umbreit, worldwide director of special systems requirements for the firm's General Systems Division and the man in charge of market planning for the Series/1 since it was announced Nov. 19, 1976.

Admitting that the Series/1 was a "different" concept for IBM initially, Umbreit said IBM was surprised by the degree of acceptance for the product in the OEM and systems integrator marketplace, particularly since IBM does not offer quantity discounts like most minicomputer companies do.

Apparently, he said, the IBM reputation for service and the widespread availability of its service organization are the major reasons for this.

The OEMs "seem to feel that is a marketable quantity," he said.

More Than 50% OEM

Presently, more than half of IBM's Series/1 business is with OEMs, Umbreit said, adding that IBM had anticipated a larger end-user content in its first year of shipments.

In either case, however, he indicated that IBM has been going after the multiple-unit

(Continued on Page 60)

Committee to Manage Entrex

BURLINGTON, Mass. — Nixdorf Computer AG has initiated a management change at Entrex, Inc. Former president and chief executive officer Donald Fedderson was replaced with a four-man management executive committee.

The committee will oversee both Entrex, Inc. and Nixdorf Computer, Inc., both of which are owned by the German firm Nixdorf Computer AG.

Fedderson resigned by mutual agreement, according to Tom Conway, who recently moved from vice-president of finance to executive vice-president and chairman of the executive committee.

Others on the committee are Ken Butler, recently named executive vice-president, who will retain responsibility for marketing; Eric Jackson, senior vice-president, engineering and development; and John Lyons, senior vice-president, manufacturing.

Conway said Fedderson was the only employee to depart during the recent shuffle.

No changes in Entrex' product line are anticipated, he indicated.

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ICL Planning Moves to Penetrate U.S. Market

By Molly Upton
CW Staff

NEW YORK — ICL, Ltd. has a number of product enhancements up its sleeve in its efforts to penetrate the U.S. marketplace, officers indicated at a press conference here recently.

In addition to the System Ten Accounting and Reporting System II (Stars) announced for the upgraded System 220 series, ICL expects to offer Cobol on its 1500 terminal, according to Kenneth Billings, vice-president of systems support.

Geoffrey D. Rowett, president of the marketing division, said ICL's thrust in the U.S. is in the area of smaller products in order to establish a base upon which it can build. "It would be stupid to bring in big products" at this point, he said.

ICL looked at the U.S. market for some time and then bought manufacturing facilities in Utica, N.Y. from Singer Co.

Now, it is "high time we attacked the largest market. You cannot be an international success without being in the U.S.," Rowett remarked.

Since introducing the System 220 in June in the U.S., ICL has sold 17, which Rowett termed "pretty impressive."

In the seven months since the system was announced in the UK and Europe, over 600 have been sold, he added.

Software for the System 10, 220 series includes data management facility (DMF-2), assembler, sort and Stars II, and there will be further software for particular markets, he added.

Intermark Systems of Dallas created the Stars-II, which provides order entry, general ledger and trial balance capabilities, Rowett said.

ICL expects the 220's chief market will be wholesale distributors.

The 1500 is directed at service bureaus and large firms' remote data capture and communications functions, he said, as well as large telephone companies.

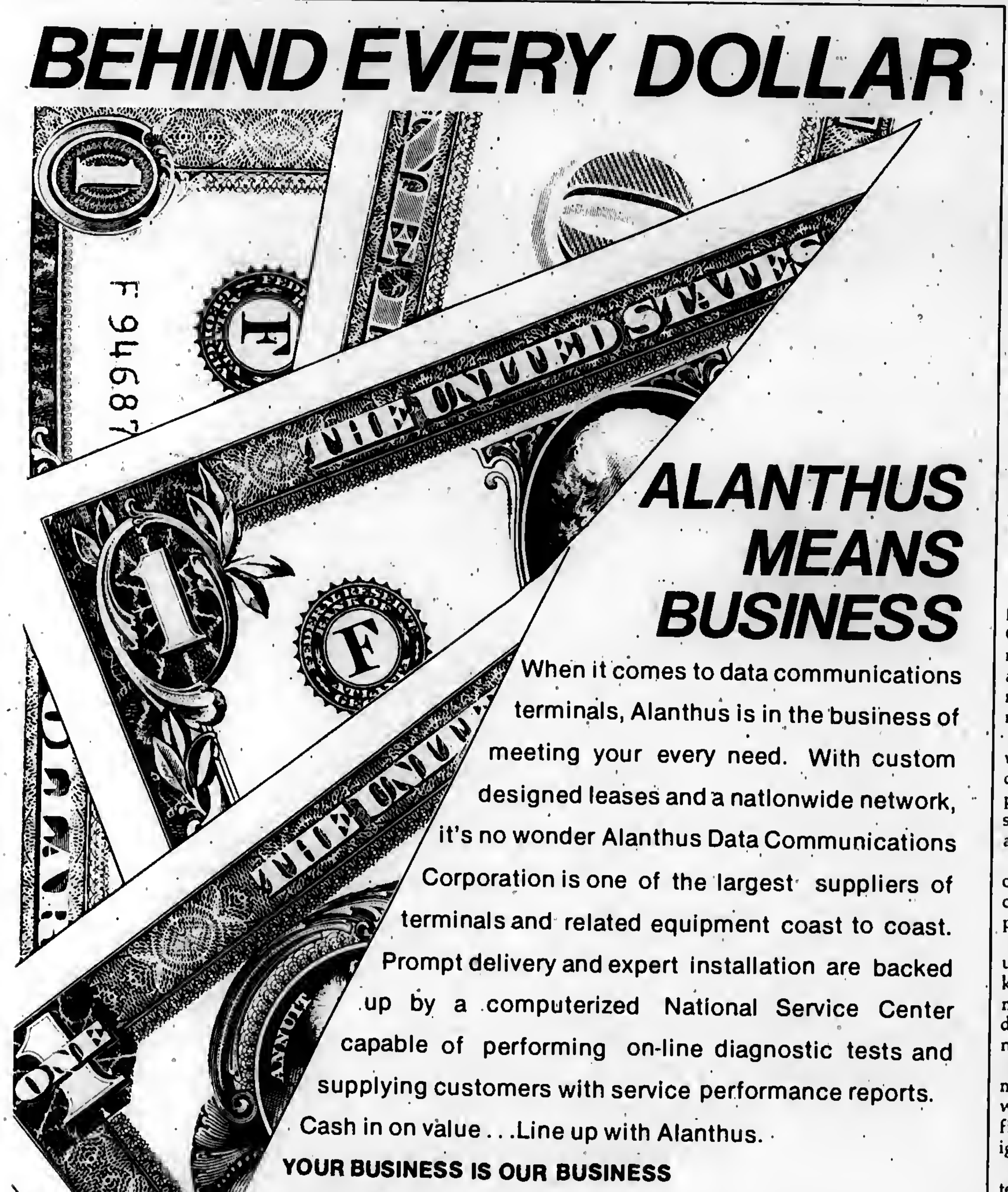
The 1500's current software includes a data entry language and PTE, a disk-oriented language.

With the 2903 series, ICL is attacking the System/3 market, but initially on a limited geographical basis. The advantages of the 2903 versus a 3/15 are direct data entry, communications capabilities and a lower price, he said.

The initial campaign, called "Exit 3," centers on the New York, New Jersey and Philadelphia area, according to Rowett. "There are no immediate plans to attack the System/3 nationwide until we can prove we can do what we think we can," he said.

To lure System/3 customers, ICL will aid in data conversion. The 2903 uses RPG, but with a different word structure, Billings explained.

ICL provides service on the 2903 while TRW provides maintenance on the System Ten and the 1500, Rowett indicated.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More End Users Buying Series/1

(Continued from Page 59)

buyer marketplace, whether it was OEM or end users and that the system is "just about on plan."

These users — who may be installing up to 100 or more minis for a single application or in a distributed network — want a system that has tightly controlled hardware and software, he said. They don't want systems that have extra capability they can't use since they have to pay for that capability and those costs can mount up very fast for users buying many systems, he indicated.

That's why IBM went with the modular approach for both hardware and software with the Series/1, he said.

In particular, the system is designed for people who don't want "manufacturer-dictated" operating systems in that it allows them to design their own operating systems or purchase them separately.

End-User Business

While the first year's U.S. business for the firm has been more than 50% to OEMs, Umbreit said end-user business was picking up in recent months and that the firm had been selling to more end users then OEMs in Europe right along.

End users, he said, have been less willing to add independent peripheral devices to the Series/1 than was expected so there has been a lot of pressure on IBM to add more peripherals and software to the system.

"We will need to upgrade the system over time," he said, adding that IBM currently has an "active development program" for the system.

The biggest pressures from Series/1 users today are for a larger disk, keyboard CRT, Cobol and a data base management system, Umbreit said, indicating IBM wants "to fill user needs."

In addition, he indicated that superminis in the 32-bit class of machines were the fastest growing area in the field and that IBM "probably couldn't ignore this field forever."

There is also a great deal of user interest in Fortran and PL/I, he said, with European users showing more interest in PL/I then U.S. users.

While many had felt that the introduction of the Series/1 would lead to competition with other minis within the IBM organization, Umbreit said that to date the Series/1 had mainly created new business for the firm.

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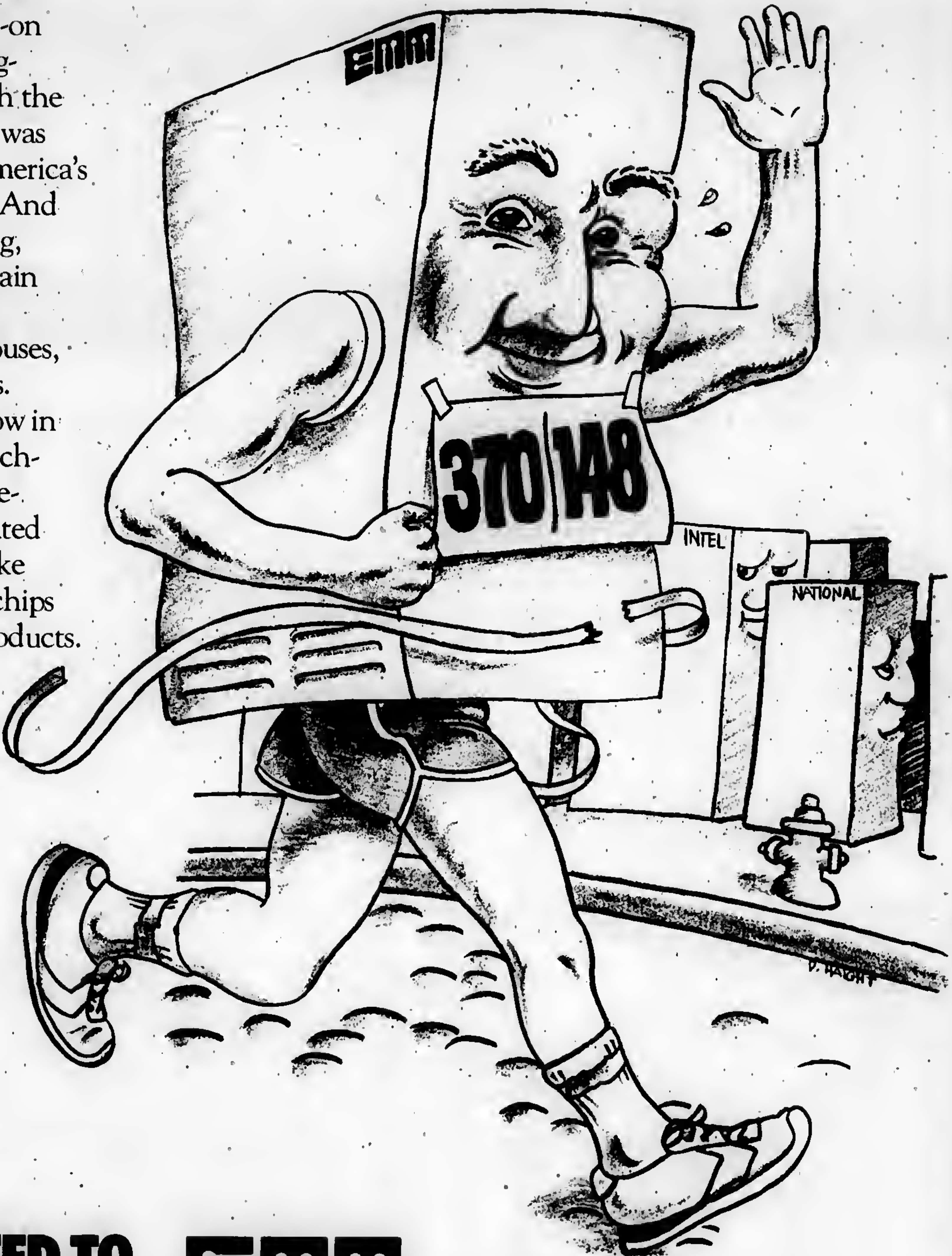

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CI Notes

Judge Asks Memorex To Outline Issues

SAN FRANCISCO — Preparations for the Memorex Corp. vs. IBM antitrust trial, scheduled to begin in January, are proceeding. However, the most recent filings were made under a protective order and thus are not available to the public.

Judge Samuel Conti asked Memorex for a statement of proof, indicating he would not welcome the idea of a trial that simply presented a rerun of issues that had been tried previously in other courts. IBM has also filed its statement.

Conti will hold a pretrial meeting here Nov. 21.

Play It Again, George?

CUPERTINO, Calif. — Having founded one company — Diablo Systems, Inc. — George Comstock is at it again, this time with a venture called Durango Systems, Inc., which intends to design and manufacture a family of small business systems.

Joining Comstock in founding Durango are other old Diablo hands: John M. Scandalios, formerly vice-president of operations at Diablo, who will be responsible for marketing and Charles Waggoner, formerly Diablo director of engineering.

And Sutter Hill Ventures, which arranged the financing of Diablo Systems in 1969, is providing lead financing for Durango along with Citicorp Venture Capital, Ltd.

Scandalios indicated Durango products will be marketed in North America, Europe and the Far East, primarily through a network of distributors and dealers.

Three years after Diablo was started, it was acquired by Xerox for stock valued at $29 million in 1972.

DEC Buys LEDs

MARLBORO, Mass. — Digital Equipment Corp. has selected Data Display Products' light-emitting diodes (LED) as field replacements in its fixed-mount bezel display panel for PDP-10s, according to John Shebell, who is head of maintainability for the large engineering group at DEC.

The LEDs were selected because of their reliability, Shebell stated, adding DEC has demonstrated a mean time between failure of over five years in the field.

With a fixed-mount bezel such as that found on the PDP-10, replacement is an awkward process, he said. The long life of the LEDs and the elimination of more frequent replacement of incandescent lamps should more than compensate for the increased cost of the parts, he indicated.

DEC is not using LEDs on its newer Decsystem-10s because they do not have lights, Shebell said.

Amdahl Production Up

SUNNYVALE, Calif. — Amdahl Corp. increased its production capacity 25% during the quarter ended Sept. 30, up from four systems per month to five, the firm stated in a financial report.

During the third quarter it shipped 93% as many systems as it did during the first three quarters last year, the firm added.

Amdahl plans to add another 25% increase in capacity during the fourth quarter when a manufacturing facility now under construction is completed.

With its increased production came increases in personnel. During the quarter, employment rose 26% to 1,500 about 91% greater than at the beginning of the year, Amdahl indicated.

During the latest quarter, Amdahl was directly leasing two systems to customers.

Supershorts

BASF Systems, Inc. intends to begin shipping its version of the mini floppy disk in March or April.

— — —

Mohawk Data Sciences Corp. plans to announce expansion capabilities for the models 21/20 and 21/40 within the next few months and will introduce a new model within the Series 21 family before next April, Ralph H. O'Brien, chairman and president, told a recent stockholders meeting.

— — —

Dr. Lewis M. Branscomb, chief scientist and vice-president at IBM, will chair the Committee on Scholarly Communication with the People's Republic of China, which promotes scientific, technical and academic exchanges between the U.S. and that country.

— — —

Sycor, Inc. has elected Data Systems of Traverse City, Mich., as a distributor for Michigan's lower peninsula.

— — —

CPC International, Inc. has sold its interest in Information Science, Inc. to the Edgar B. Mitchell Corp., headed by the ex-astronaut of the same name.

— — —

We all know about stockholder meetings, but Centronics Data Computer Corp. recently held its second annual employees meeting, which honored more than 100 employees who have been with the company for more than five years.

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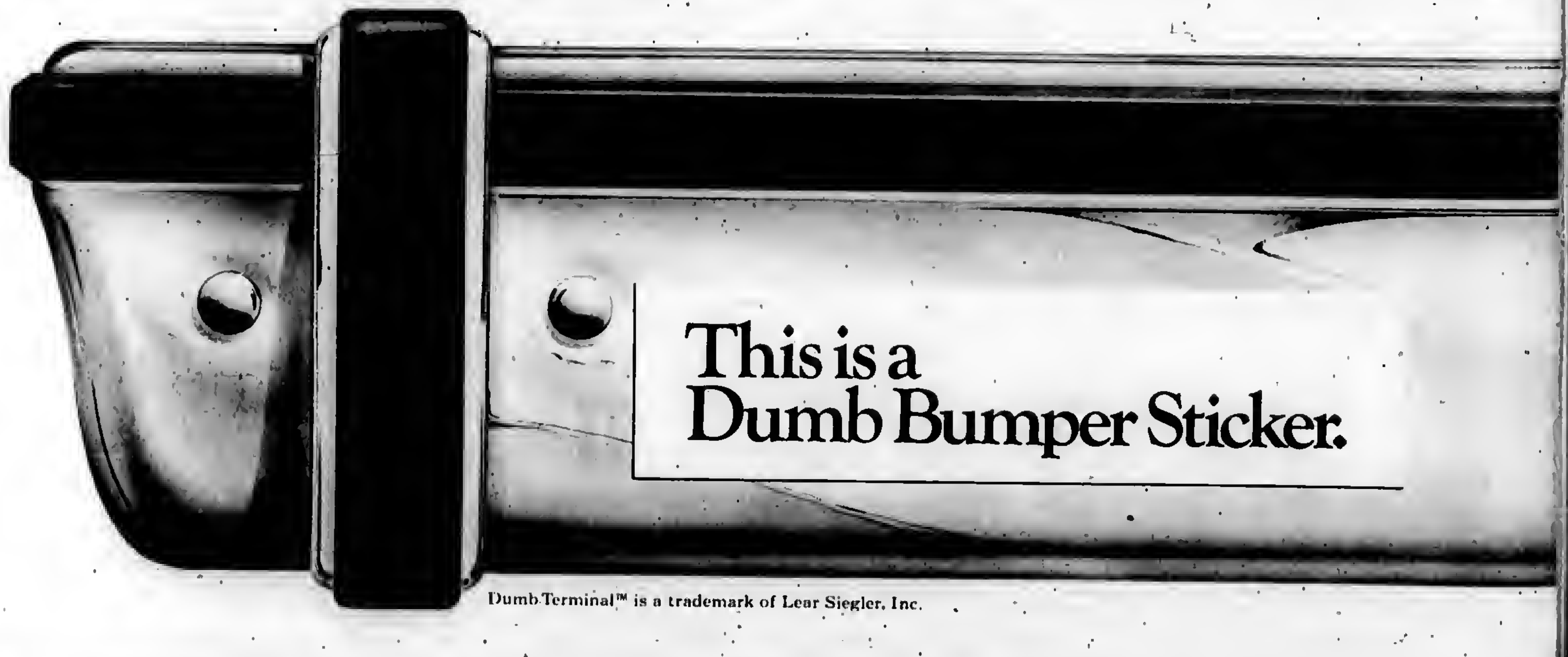

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Firm Branching Out

Basic/Four Sets Sights on Big, Distributed Sites

By Esther Surden
CW Staff

IRVINE, Calif. – Basic/Four Corp. is branching out.

After six years of "successful operation" in the small business computer marketplace, the firm has added enhancements to its systems to allow them to be used in the distributed processing market area, according to Joseph F. Pleso, director of distributed processing.

With the recent enhancements, the user can get a stand-alone turnkey system that looks like a remote batch terminal to an IBM mainframe, Pleso explained.

About 85% of Basic/Four's business presently comes from single-user sites; Pleso admitted the firm has not been "too successful" selling systems to users in the $25,000 and above range. To attack this market, the firm is putting together a dedicated marketing force that "understands the large environment," he said.

Basic/Four thinks it can offer a viable product to large users because it offers many application packages that run on its small systems. This will make the systems attractive to those who don't have the resources at remote sites to write their own application programs, Pleso said.

In the beginning, the systems will be specifically aimed at the wholesale/-distributor, manufacturing, hospital and insurance industries, he added.

Plans for SDLC

Basic/Four intends to upgrade its communications capability next April with the introduction of a communications controller that will allow the systems to address bit-oriented protocols such as IBM's Synchronous Data Link Control (SDLC), Pleso stated. The development of distributed processing at Basic/Four will eventually evolve into a total architecture, with the largest system, the 700, used as a host and the smaller systems connected to it in a network, he predicted.

While providing a network is an ultimate goal, Pleso noted that Basic/-Four will not do specialized work. The company will present a package and will only bid in situations that can benefit from a packaged solution, he said.

Prospective competitors in this area are IBM, Four-Phase Systems, Inc., Datapoint Corp., Harris Data Communications, Raytheon Data Systems Co., Digital Equipment Corp. and Hewlett-Packard, he noted.

Another advantage to Basic/Four's approach, in Pleso's opinion, is the availability of a field service organization already in place. Basic/Four uses its sister company Sorbus; Sorbus personnel have experience in serving companies that have communications capabilities, Pleso pointed out.

Foreign Orders & Installations

Crown Agents of Sutton, Surrey, England has ordered a Honeywell Model 66/05 computer system valued at $1.12 million.

Britain's Royal National Institute for the Blind has placed an order with GEC Computers Ltd. of Hertfordshire, England, for the supply and maintenance of GEC 4070 computer equipment to be used in the production of braille literature.

Five European sites have installed Electronic Memories & Magnetics add-on memory systems with a value of more than $750,000.

The UK Post Office has placed an order with Lundy-Farrington Ltd. for a data entry system for the National Giro Centre in Bootle, England.

The Independent Broadcasting Authority of Brentford, England, has ordered a Honeywell Model 66/10 system valued at $1.2 million.

The European Center for Medium Range Weather Forecasts, located in Bracknell, England, has chosen a Control Data Corp. Cyber 175 computer to be used in conjunction with its Cray-1 computer. The value of the contract is approximately $5 million.

The Spanish Nuclear Energy Board (Junta de Energia Nuclear) has ordered a Univac 11110 system from Univac. The computer will be installed at the board's facilities in Madrid.

Taihan Electric Wire Ltd. in South Korea has ordered DTS Series 100 component kits from Data Terminal Systems, Inc., worth $1.1 million.

G.W. Sparrow & Sons Ltd. of Bath, England, international specialist in crane renting and hoisting, has ordered a Honeywell Level 62 small-scale system.

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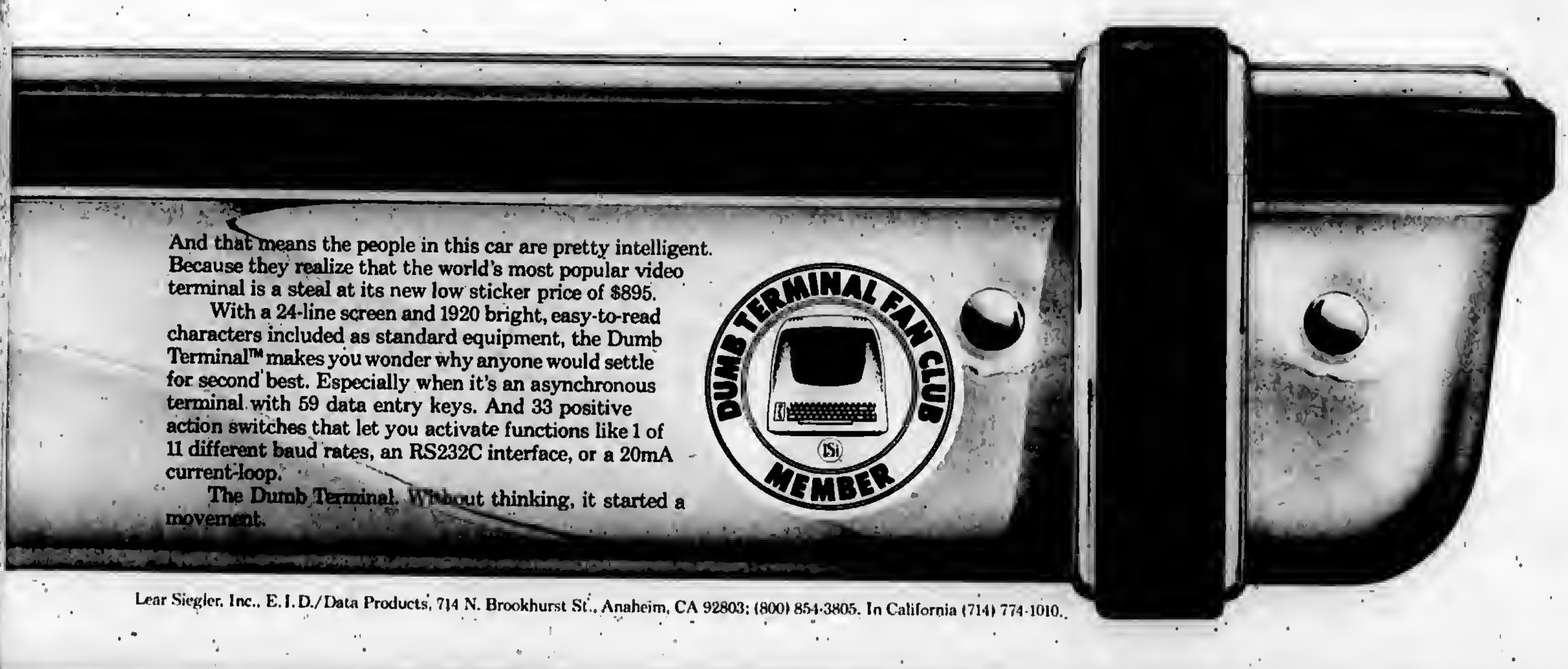

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After First 18 Months

CA Seeking to Control Growth of Syfa Sales

IRVINE, Calif. — About a year and a half after Computer Automation, Inc. (CA) introduced its Syfa system, about 150 such systems are in place at approximately 15 customer sites, according to Ivan Socher, general manager of the firm's Commercial Systems Division.

"The fewer customers we have, the better," Socher continued. CA has never been production-limited, he explained. "but the fear is that we will become support-limited." As time goes on, it is becoming tougher and tougher to control sales growth for the system, despite the fact that CA has not added a salesman in a year and has no plans to, he stated.

The Syfa system is sold in the distributed processing marketplace, but Socher preferred not to give a precise definition of the term. Distributed processing "is whatever suits the speaker or the listener," he noted. He did venture the opinion that distributed processing has nothing to do with computers, but rather relates to how all work is processed throughout an organization.

"What we appear to be supplying to people are data networks," Socher pointed out.

Decentralization, however, is "no doubt" the wave of the future, but at the moment the industry could be headed into an "unbalanced situation," he said. Centralizing all applications was at one time the only way of doing things, he noted, adding that now people are saying "Why don't you distribute all of the processing..

"I'm not sure its going to hit a happy medium," he continued, "but the manufacturers are going to win no matter what happens."

Acceptance of decentralization won't happen "at the pace you hear talked about," he predicted, because "IBM decided it's not going to happen at that pace . . . it's far too expensive for IBM to do it."

Hard to Control

What makes the Syfa system's growth so hard to control? "It wins benchmarks," Socher said. The Syfa offers a better price/-performance than any comparable system, he claimed. No one particular system feature sells it, but the ability of all the parts of the system to work together to beat the competition is its biggest plus, he said.

Compeition for the system comes from a number of quarters. "IBM is in there, but never seems to have the same product," he noted. The mainframer has bid systems ranging from the IBM System 32 to the 3033 against the Syfa, he explained, adding that "We never miss DEC" in a bidding situation. "It never [initially] goes in with the 11/70 but we always end up competing with the 11/70," he said. Hewlett-Packard Co., Datapoint Corp. and Data General Corp. are other competitors for the system.

Socher noted that the Syfa performs three functions well: data capture, local processing and communications.

It will not win in situations in which any one of the functions is needed to the exclusion of the others or an unbalanced situation, and the firm prefers to withdraw from bids that require this, he said.

About 80% of the business done with the product results from references from existing customers, he added.

Contracts

Computer Network Corp. has been awarded a facility management contract valued at approximately $3 million by MCI Telecommunications Corp.

Data Dimensions, Inc. has entered into a systems management contract with W.H. Sadlier, Inc. of New York City. The work will be processed at Data Dimensions' data center in Greenwich, Conn.

Keane Associates, Inc. has received a two-year contract from the State of Rhode Island to develop an integrated state payroll and personnel system. The contract is valued at over $150,000.

Cambridge Memories, Inc. has been awarded a contract by the Automated Data and Telecommunications Service of the General Services Administration to provide core memory systems to federal agencies using certain models of IBM computers.

Sorbus, Inc. has signed a five-year national service contract with Omnitec Data of Phoenix, Ariz.

The Western Union Telegraph Co.'s Government Systems Division has been awarded a contract to provide a digital data communications system consolidating high-speed data and secure voice requirements of various U.S. government defense and intelligence agencies in the Washington area. The award was made by the U.S. Army Electronics Command and represents approximately $17.5 million in revenues over its 10-year service life.

Macrodyne Industries, Inc. has signed an agreement with Uppster Corp., which granted it the exclusive right to manufacture and assemble the Uppster Model PEP 6510 Ultraspeed nonimpact printer in North America and the exclusive worldwide right to manufacture its logic and power supply assemblies.

Datacrown Ltd. has signed a three-year contract with Agriculture Canada. The contract for DP services is valued at $850,000 per year.

Texas Instruments, Inc. has begun a $500,000 program with Walgreen Drug Stores to install computer systems in that chain's pharmacies throughout the U.S.

Penril Corp. has received a contract from Western Union for nationwide maintenance of its Data Communications Division product line.

Digital Equipment Corp. has signed a multimillion-dollar contract with Heath Co. for LSI-11 microcomputers and related products.

On-Line Systems, Inc. has had its contract with the Department of Health, Education and Welfare Office of Education renewed to develop and operate an automated student loan management system.

The Montek Division of E-Systems, Inc. has been awarded a $2.1 million contract for the manufacture of 75 shipsets of automatic flight controls for the 747 series aircraft by Boeing Commercial Airplane Co. of Dallas.

Electronic Memories and Magnetics Corp.'s Severe Environment Products Division has received a contract from the Aerospace Division of Control Data Corp. to become the second-source supplier of memories for the AYK-14 program.

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Microdata Eyeing Growth Above Industry Rate

By Esther Surden
CW Staff

IRVINE, Calif. — Although "we didn't make up the loss of OEM business that left when Basic/Four Corp. built its own mini," Microdata Inc. is still growing and is "in pretty good shape," according to Donald W. Fuller, Microdata's president and chairman of the board.

In a recent interview here, Fuller said the only problem Microdata faced was that "it didn't grow like hell last year" as Fuller had publicly predicted it would. "We are not making any overly optimistic projections . . . but we still intend to grow in excess of the industry growth rate," he continued.

Microdata recently reported a drop in net income from almost $3 million last year to close to $2 million this year.

Right now the firm doesn't have an OEM customer that accounts for more than 10% of its business, and Fuller would like to keep things that way. In fact, although it takes a great deal of stamina and wherewithall to turn down any business, the president said that if a major company wanted to give the firm that much business "we would encourage it to take a license and go to manufacturing as opposed to having our whole production totally skewed by one large customer."

The OEM business at Microdata is built around the firm's Express Cobol-oriented mini system and a line of OEM peripherals introduced at the National Computer Conference in June 1976.

"We are selling the Express in a directed method" and only to OEMs or large-scale end users, he said. "We were late with the software," Fuller admitted, but said all those problems have been "solved."

The major reason for targeting the system at the sophisticated user is the use of Cobol. Fuller said the first-time user should be able to learn the language used on his system within a week. By concentrating on large users, Microdata "can stay out of any conflict" with the Reality dealer.

The firm does not want the dealers "to sell it to the end user at the expense of a Reality sale. It's not intended to be a single end-user system," and if it were sold to that environment, problems with support could come up.

The firm has shipped "in excess of 20 of the systems," most of which are software development machines. The first system was shipped in August.

The peripherals introduced at NCC in 1976 are also in production and about 20 of the Reflex disk drives have been delivered and are undergoing customer evalution. The company has moved away from just being a CPU OEM, because OEMing systems and peripherals is less susceptible to the "pricing tactics of the semis" he said.

Attractive Features

The firm decided to add a lot of features to its peripherals to make them easy to maintain and very reliable, making the units attractive to technology - conscious companies.

However, the market is both cost- and technology-conscious, he noted, so the company needs volume to drive the cost of the systems down.

Microdata recently entered an agreement to acquire Computer Machinery Companies (CMC). The agreement calls for Microdata to acquire 75% of the common stock of CMC/UK, Fuller noted.

The acquisition will give Microdata an entry into lucrative business abroad, he indicated. CMC, a supplier of data entry equipment, already has an able hardware and software capability in place, which Microdata intends to use to promote its product line. Presently Microdata's worldwide market is only 10% of its business, and Fuller said it could be expanded to 35% with the in-place support.

It will be a mutually beneficial agreement, he noted, because CMC needs a pipeline to the technology in this country, while Microdata avoids the cost of setting up its own extensive operating abroad.

Customer Terminals Subject of Project For Savings Banks

NEW YORK — The Mutual Institutions National Transfer System, Inc. (Mints), an organization serving the savings bank industry and other thrift institutions, is instituting a project to develop guidelines for the deployment of terminals capable of providing customer-activated financial services. The guidelines will include system specifications, detailed procedures, terminal requirements and audit and control requirements.

Customer activated terminals can range from simple check-authorizing terminals to complex devices capable of providing depository services. These terminals will be deployed by thrifts both in their own branches and merchant locations. The project is intended to accelerate the rate of deployment.

The cost of the project will be borne by Mints member institutions and others such as terminal manufacturers, who wish to participate. At the conclusion of the project, each participant will receive all terminal and systems specifications and procedures (project deliverables).

Those interested in participating or learning more about this project should contact Denis Manelski, vice-president of operations at 200 Park Ave., New York, N.Y. 10017.

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7-4015

Jacquard Systems Starts Small But Thinks Big

By Esther Surden
CW Staff

SANTA MONICA, Calif. — For a small company, Jacquard Systems has some big ideas about where it would like to be in the small business marketplace.

The firm offers a multiuser, interactive system that can do both word processing and data processing as well as handle communications, according to Dick Williams, vice-president of marketing. Jacquard is a little over eight years old and was founded by President Edgar Bolton and others who came from several high technology industries.

The founders had been designing hardware and software for critical applications such as those in the space industry, Williams noted.

For the first six years, Jacquard was a systems house dedicated to customized work. It designed such systems as an airport parking lot system that kept track of time and payments of drivers using the lot.

The customized systems led to the development of a system with a time-shared operating system that could drive multiple remote devices in a communications networking environment, Williams said.

First Standard Product

The first standard DP product that came from the group was Jacquard's J100 system with communictions capability. It was billed as a "distributed processing system" for remote data base applications.

To sell such a system, however Jacquard had to market to the largest Fortune 1,000 firms, which were difficult for the small company to reach. The company decided to broaden its approach with the addition of software for generalized accounting. The J100 then became a general-purpose computer system.

In the middle of 1976, Jacquard took the J100 one step further with the introduction of a word processing software package. The package was developed in-house in response to requests from Jacquard's own staff, Williams said.

In this marketplace, the system competes with shared-logic word processing systems as well as the combination word processing and data processing systems introduced by Digital Equipment Corp. and IBM, he noted.

The combination of word processing and data processing in the office is inevitable, Williams said. "I believe there is no way to stop these two worlds coming together," he stated, adding Jacquard plans to be in the forefront of this marketplace.

Jacquard sells its combination system through distributors. Presently there are 28 in the U.S. and several in foreign countries.

The company, which is privately held, did about half of its business overseas. Quoting the Dunn and Bradstreet report on his firm, Williams said the company made about $2 million in sales last year and is looking forward to substantial growth next year. The firm has several hundred systems installed.

"We are really a final assembly and test plant," Williams noted. The company buys all PC boards from outside vendors and integrates them into a system.

The CPU, however, is the firm's own and is designed around a Texas Instruments IMP-16 microcomputer, which is a component of the system like other components, he stated.

Large markets for the system can be found in four professions, he stated. Lawyers, doctors, dentists and accountants are prime targets because they have large word processing and data processing requirements.

Calcomp Files For New Trial, Cites Greyhound

SAN FRANCISCO — Citing the Ninth Circuit Court of Appeals' ruling in the Greyhound Computer Corp. vs. IBM case, California Computer Products, Inc. said in its second filing with the court that it, too, should be granted a new trial.

The filings by Calcomp are appealing the directed verdict Judge Ray McNichols granted IBM last Februry, thus removing the three-month-old trial from the jury.

In the Greyhound case, the appeals court remanded the case for a new trial after years of deliberation over a directed verdict.

The Calcomp reply brief claimed Calcomp is "entitled to prove the whole of IBM's scheme to monopolize and to develop fully IBM's anticompetitive intent."

Calcomp refuted IBM's argument that because the Fixed Term Plan (FTP) was held lawful in the Greyhound and Telex cases, it cannot be an issue in the Calcomp case. Calcomp said the evidence it presented is "substantially different and far stronger than that presented by Greyhound."

In the Greyhound case, the court said Greyhound failed to show the FTP was "anything more than a reasonable response to competition."

IBM has petitioned the court to reply to the latest Calcomp filing, which normally would be the last filing before a decision by the court, sources indicated.

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Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
- An overview of DP media — what to look for, how to get it
- Pooling resources — how four companies share quantity discounts

We'll also look at the practical aspects of computer security in this report, with articles like these:

- Effective contingency planning — targeting danger areas
- Computer crimes and disasters — how to cut losses and minimize risk

If you're a DP Manager, MIS Director or Corporate Executive with responsibility for DP cost control and security, be sure to read the special report in our year-end combined issue. And if you market products or services that cut the cost of computing, or safeguard what's in the computer room — advertise in this report. Ad closing date is December 9. For details, call your Computerworld salesman. To reserve your ad space, call Terry Williams at (617) 965-5800.

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Earnings Reports

INFORMATION MAGNETICS
Three Months Ended Oct. 1

	1977	1676
Shr Ernd	.....	$.17
Revenue	$9,506,000	6,053,000
Earnings	(442,000)	373,000
9 Mo Shr	.16	.65
Revenue	25,452,000	24,583,000
Tax Cred	.....	46,000
Earnings	25,452,000	24,563,000

ITEK
Three Months Ended July 1

	1677	1879
Shr Ernd	$.17	$.24
Revenue	62,854,000	50,708,000
Tax Cred	67,000	.....
Earnings	523,000	744,000
6 Mo Shr	.36	.38
Revenue	105,513,000	104,063,000
Tax Cred	183,000	.....
Earnings	1,209,000	1,128,000

KEYDATA
Year Ended July 31

	1977	1976
Shr Ernd	$.13	$.40
Revenue	14,658,000	14,676,000
Tax Cred	154,000	515,000
Earnings	349,000	1,102,000

LEWIS BUSINESS PRODUCTS
Three Months Ended July 31

	1677	1678
Shr Ernd	$.15	$.22
Revenue	7,709,000	7,686,000
Earnings	186,000	a309,000
9 Mo Shr	.61	.83
Revenue	23,999,000	23,196,000
Earnings	630,000	e613,000

e-Includes $143.000 gain on insurance settlement.

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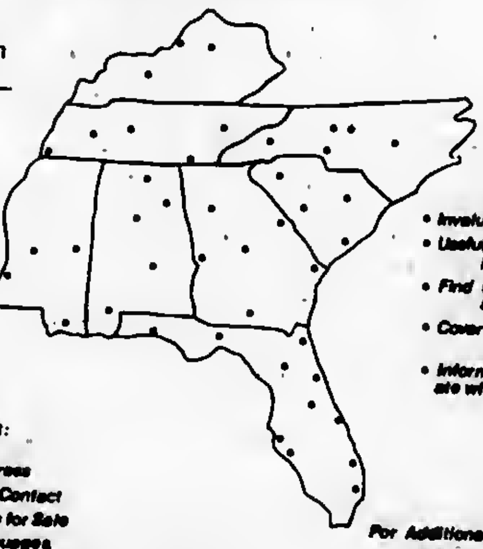

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MAGNETIC CONTROLS
Three Months Ended July 29

	1677	1678
Shr Ernd	$.28	$.45
Revenue	5,260,000	4,989,000
Earnings	278,000	431,000
9 Mo Shr	.96	.88
Revenue	16,766,000	13,461,000
Earnings	879,000	637,000

MEGADATA
Nine Months Ended July 31

	1977	1076
Shr Ernd	$.06	$.24
Revenue	4,565,000	4,247,000
Earnings	74,333	194,973

MICROFORM DATA SYSTEMS
Year Ended July 29

	1977	1978
Shr Ernd	$.26	$.36
Revenue	24,519,300	20,999,600
Spec Cred	795,000	1,080,000
Earnings	1,601,800	2,051,700
3 Mo Shr	.20	.12
Revenue	6,792,300	5,845,800
Spec Cred	544,200	379,600
Earnings	1,091,600	836,900

MOHAWK DATA SCIENCES
Three Months Ended July 31

	1977	1879
Shr Ernd	$.26	$.10
Revenue	35,815,000	36,946,000
Tax Cred	45,005	546,000
Earnings	1,692,000	1,436,000

MOSTEK
Three Months Ended July 1

	1977	1976
Shr Ernd	$.32	$.21
Revenue	21,036,000	13,464,000
Earnings	1,362,000	601,000
6 Mo Shr	.52	.35
Revenue	36,236,000	26,069,000
Earnings	2,188,000	1,491,000

APPLIED DIGITAL DATA
Three Months Ended Aug. 31

	1977	1976
Shr Ernd	$.26	$.33
Revenue	9,423,364	6,148,012
Earnings	1,611,647	1,249,072
9 Mo Shr	.75	.66
Revenue	22,620,648	18,558,414
Earnings	3,837,855	3,273,172

COMPUSCAN
Three Months Aug. 31

	1977	1876
Shr Ernd	$.02	$.12
Revenue	2,734,000	3,102,000
Earnings	51,000	256,000

DECISION DATA COMPUTER
Three Months Ended Aug. 27

	1977	1976
Shr Ernd	$.10	$.12
Revenue	6,767,000	6,721,000
Tax Cred	139,000	.....
Earnings	377,000	440,000
9 Mo Shr	.24	.....
Revenue	25,170,000	25,542,000
Tax Cred	376,000	.....
Earnings	994,000	(152,000)

DOCUMATION
Three Months Ended Aug. 12

	1977	1978
Shr Ernd	$.26	$.24
Revenue	6,961,000	5,447,000
Earnings	768,000	635,000
8 Mo Shr	.46	.36
Revenue	15,274,000	6,733,000
Earnings	1,359,000	1,021,000

ENNIS BUSINESS FORMS
Three Months Ended Aug. 31

	1977	1678
Shr Ernd	$.31	$.26
Revenue	15,890,710	15,778,767
Earnings	669,716	577,654
6 Mo Shr	.57	.50
Revenue	31,167,480	30,633,319
Earnings	1,240,326	1,109,207

NATIONAL CSS
Three Months Ended Aug. 31

	1677	1976
Shr Ernd	$.60	$.70
Revenue	11,885,000	10,340,000
Earnings	619,000	905,000
6 Mo Shr	1.57	1.36
Revenue	23,439,000	20,494,000
Earnings	1,767,000	1,558,000

MANUFACTURING DATA SYSTEMS
Year Ended Aug. 31

	1977	1976
Shr Ernd	$.92	$.64
Revenue	22,193,000	18,292,000
Earnings	2,440,000	1,747,000
3 Mo Shr	.26	.18
Revenue	6,352,000	4,458,000
Earnings	760,000	480,000

MICRODATA
Year Ended Aug. 31

	1977	1976
Shr Ernd	$.68	$1.51
Revenue	37,717,000	31,724,000
Earnings	1,617,000	2,945,000
3 Mo Shr	.31	.47
Revenue	10,482,000	12,050,000
Earnings	890,000	1,061,000

TAB PRODUCTS
Three Months Ended Aug. 31

	1977	1978
Shr Ernd	$.59	$.66
Revenue	12,872,000	11,977,000
Earnings	465,000	633,000

TEKTRONIX
Three Months Ended Aug. 20

	1077	1978
Shr Ernd	$.87	a$.46
Revenue	120,412,000	89,543,000
Earnings	11,756,000	6,419,000

a-Adjusted for a two-for-one stock split paid in May 1877.

BURROUGHS
Three Months Ended Sept. 30

	1977 (000)	1976 (000)
Shr Ernd	$1.06	$.92
Revenue	460,292	443,235
Earnings	43,172	37,166
0 Mo Shr	2.09	2.56
Revenue	1,447,666	1,312,608
Earnings	121,106	103,026

COMDISCO
Year Ended Sept. 30

	1977	1076
Shr Ernd	$3.06	$2.13
Revenue	112,607,000	84,033,000
Earnings	3,160,000	2,325,000

COMMUNICATIONS SATELLITE
Three Months Ended Sept. 30

	1077	1678
Shr Ernd	$.85	$.76
Revenue	44,058,000	36,269,000
Earnings	9,547,000	7,907,000
9 Mo Shr	2.74	2.65
Revenue	126,044,000	113,001,000
Earnings	27,383,000	29,497,000

BARRY WRIGHT
Three Months Ended Sept. 30

	1077	1978
Shr Ernd	$.47	$.37
Revenue	13,344,000	11,664,000
Earnings	778,000	805,000
9 Mo Shr	1.37	.64
Revenue	41,363,000	35,204,000
Earnings	2,241,000	1,534,000

COMSHARE
Three Months Ended Sept. 30

	1677	1976
Shr Ernd	$.34	$.24
Revenue	6,230,600	3,725,000
Tax Cred	176,000	105,000
Earnings	566,300	336,600

AUTOMATION INDUSTRIES
Three Months Ended Sept. 30

	1077	1976
Shr Ernd	$.54	$.27
Revenue	63,063,000	58,070,000
Tax Cred	.....	246,000
Earnings	2,893,000	1,863,000
6 Mo Shr	1.47	1.12
Revenue	195,509,00	178,856,000
Earnings	a6,362,000	7,871,000

a-Includes $1 million gain from resale of certain assets.

SOOTHE COURIER
Three Months Ended Sept. 30

	1977	1878
Shr Ernd	$.70	$.31
Revenue	19,074,000	15,095,000
Earnings	2,414,000	1,102,000
0 Mo Shr	1.50	.77
Revenue	53,614,000	41,707,000
Earnings	5,238,000	2,852,000

BUNKER RAMO
Three Months Ended Sept. 30

	1877	1976
Shr Ernd	$.50	$.34
Revenue	83,757,000	77,203,000
Tax Cred	.....	330,000
Earnings	3,149,000	2,615,000
0 Mo Shr	1.19	.65
Revenue	257,415,000	241,767,000
Tax Cred	.....	1,680,000
Earnings	7,519,000	5,709,000

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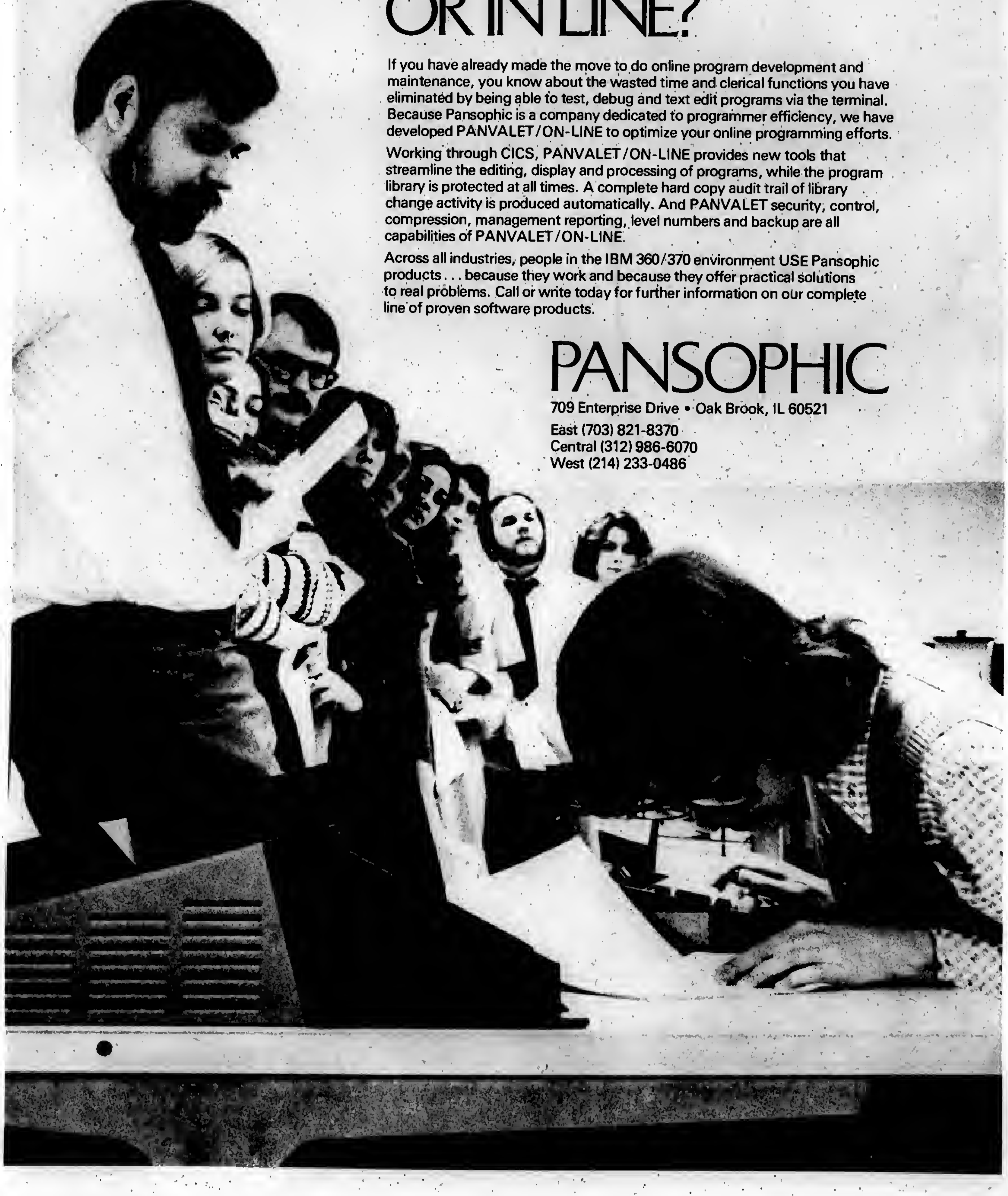

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From Pertec's View, Tape Mart Not Shrinking

By Esther Surden
CW Staff

LOS ANGELES — A myth has been circulating in the minicomputer peripheral business that says the tape market is either bottoming out or will only grow about 5% per year, according to Ralph Gabai, vice-president and general manager of Pertec Computer Corp.

It's a myth that is clearly disproved in Pertec's own minicomputer tape drive business, Gabai noted.

That business is growing at from 17% to 20% this year, he said, and the primary reason this market continues to grow is that there is no real alternative to tape for backup. It offers the lowest cost per bit of any medium and is also industry-compatible so that data stored on tape can be transferred to other systems, he noted.

Pertec's tape operation is growing at the super mini end. The first deliveries of the firm's 125 in./sec autoload tape drive using group code recording (GCR) 6250 technology have been made and the firm is now working on and is "very close to bringing to market" a GCR 6250 tape formatter.

The device has "upwards of 800 chips" used to solve the "two out of nine bit error factor," Gabai noted. It will complement the company's high-performance drive so that users can read and write 6250-compatible tapes on drives containing four times the capacity now standard while at the same time paying less in terms of cost per bit, he added.

The disk market is also expanding on the high end of the mini arena, he continued. The firm recently began delivering its "cartridge extension to the D3000 disk line." The product puts two more fixed platters and heads on the disk, doubling the capacity at about a 15% increase in cost. The unit occupies the same space as its predecessor, he added.

The products are expanding the customer base for Pertec, Gabai pointed out. Minis are migrating upward toward systems that have large data bases on-line, and manufacturers and turnkey vendors are turning to independent disk and tape makers for these large-scale mini systems, he said.

Peripherals in the microcomputer market are also booming, Gabai stated. As the price of the CPU comes down, peripheral prices will appear to be more and more out of line in comparison, he admitted. This is because peripherals are inherently more sensitive to labor and materials.

In the final analysis, end users will not care that the disk or tape drive costs more than the microcomputer that controls the central processing. "The market place is going to want a system solution," Gabai said, and will only care about the total hardware and software picture.

The company is working on "new technologies" such as charge-coupled devices (CCDs), which are often touted as disk replacements, but Gabai feels the CCDs will not replace disks, because they must also be backed up. CCDs are important to the industry, however, because they will lead to the "first real computer on a chip," he continued. Presently the micro manufacturers are making a processor on a chip, but the advance in CCD technology will expand this to include memory.

Pertec has had a very good year, he added, and it expects to "track the growth in the market" and if it achieves that goal, "will be doing very well indeed."

Prime Head Sees More Growth

FRAMINGHAM, Mass. — A key question for Prime Computer, Inc. is how fast can it continue to grow, President Kenneth Fisher said recently.

Thus far the firm, a $50 million manufacturer of general-purpose interactive computer systems, sees nothing in the economy, the competitive scene, its financial situation or its ability to obtain good people that should slow its growth, he told a meeting of the New England Council of the Western Electronics Manufacturers Association (Wema).

Although Fisher acknowledged that obtaining good people is not a trivial problem, Prime's attitude is that it can get the talent it needs. If the firm cannot, it will slow down its development plans, he said.

Currently, the firm is at least doubling its number of employees each year, he added.

Prime is very bullish on the computer industry for 1978, he stated and in the industry, Fisher sees a huge demand growing at least 25%/year for the next five years.

Looking at Prime specifically, he said he sees an infinite, elastic demand with prices rising for software and declining for hardware. The demand will form an overall favorable picture of costs and pricing.

Various factors influencing growth are the marketplace, a firm's product strength and development plans, the competition, plant capacity, employee capability and financial strength, he indicated.

To aid in its planning, Prime has developed a model, Fisher said. So far it has performed 336 different runs, anticipating different changes from a price drop to the impact of various products. Prime is now fine tuning the model — and 1978 looks like a very good year, he said.

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Orders & Installations

N.Y. Social Services Orders Univac 1100

ALBANY, N.Y. — The New York State Department of Social Services has ordered a Univac 1100/43 system valued at about $9.6 million to implement new centralized welfare and Medicaid Management information systems.

When completed, the Albany center will be one of the largest computer complexes operated by any state government agency in the U.S.

The first application is scheduled to begin running this fall.

Other Orders

Houghton Mifflin Publishing Co. of Boston has ordered Computer Automation Syfa minicomputer systems for a distributed processing network that will link branch offices in six U.S. cities. The contract is valued at approximately $700,000.

American Cynamid and State Accident Insurance Fund have ordered the System 2000 from MRI Systems Corp.

The California State University and Colleges and CLSI hve signed an agreement for installation of the Libs 100 circulation control system at the university's Sacramento campus.

The Defense Logistics Agency has installed up to 40% of 200 Harris 8171 terminal systems, up to 800 CRT keyboard/display units and up to 500 Model 3115/88 printers.

New Jersey Educational Computer Network, Inc., Continental Group of Manhattan, and Schmalbach in Germany will install the System 2000 by MRI Systems Corp.

Martin Marietta Aerospace of Orlando, Fla., has taken delivery on a Calma Graphic Data System for design applications in its microelectronics operations.

The Citizen and Southern Corp. (Charlestown, S.C.), the Shawmut Bank (Boston), the South Carolina National Corp. (Columbia, S.C.) and Western Bancorp Data Processing Co. (Los Angeles) have ordered computer-based personnel systems from Information Science, Inc.

Great Western Sugar Co. of Denver has ordered three Series 21 source data entry systems from Mohawk Data Sciences Corp.

Arthur Andersen & Co. has indicated its intent to purchase Reality systems valued at approximately $2.8 million from Microdata.

Modular Computer Systems of Fort Lauderdale, Fla., has agreed to purchase from Applied Digital Data Systems, Inc. (Adds) 1,000 Adds Regent series CRT terminals valued at approximately $1 million.

Correction

In the story headlined "I-8100 Called 'Cornerstone' for NCR" [CW-Oct. 24] the I-8100 was compared with several other vendors' systems including the Burroughs Corp. B-80. Although the B-80 works in batch mode, it is primarily an interactive machine.

To Be Evaluated

NBS Gets Comments on I/O Revision Plan

BETHESDA, Md. — The National Bureau of Standards (NBS) has received eight comments on the revised implementation procedures for the proposed channel-level I/O interface standard, according to Thomas Pyke, chief of the Computer Systems Engineering Division of NBS' Institute of Computer Sciences & Technology.

Issuing a standard revision as NBS did this fall with the I/O interface, is "out of the ordinary," Pyke said [CW, Sept. 12].

Best Possible Standard

NBS' revision represents an effort to make the standard as good as it can be regarding benefits to the federal government, he observed. "We're going out of our way on a standard as important as this," he added.

NBS has placed a high priority on evaluating the comments it has received during this latest round and expects to have its analysis completed by mid-December, Pyke said.

Pyke intends to prepare individual responses, treating those issues raised both in the spring and fall periods with point-by-point comments, he said.

While it is too early to assess the content of the recent comments, eventually the NBS will compile a comprehensive report on the comments as well as a summary, he said.

After evaluating the latest round of comments, NBS must determine whether it should propose more revisions or whether the existing proposal should be submitted to the Department of Commerce for approval by Secretary Juanita Kreps.

NBS will provide Commerce with a package that includes the comments received and NBS' responses, Pyke indicated.

Respondents Named

The respondents included Honeywell, Control Data Corp., Burroughs, IBM and the Computer and Business Equipment Manufacturers Association (Cbema). The Computer and Communications Industry Association (CCIA), Congressman Jack Brooks and Norman Ream, formerly with NBS, also filed this fall.

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- *Types of computer applications* is another way you can look something up in The Index. The category *INVENTORY SYSTEMS*, for example, has 21 entries.
- *Regulatory*, *security* and *social issues* are also indexed. There are 34 entries under *PRIVACY*, 10 under *PRIVACY ACT* and 9 under *PRIVACY PROTECTION COMMISSION*, for example.
- The Index also makes it easy to look into *legal aspects of computer use* with categories like *LITIGATION*, which has 24 entries in the last six months of 1976.
- Even *foreign countries* are indexed. The category *JAPAN*, for example, has 9 entries.
- . . . and there are *others: KIT COMPUTERS* (the kind you build yourself) are the latest thing, and The Index shows 5 entries. *POINT-OF-SALE SYSTEMS* has 14 entries . . . and there's much, much more.

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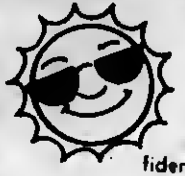

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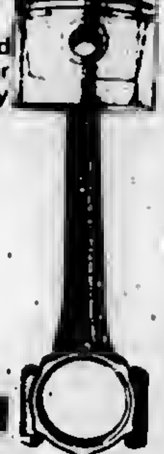

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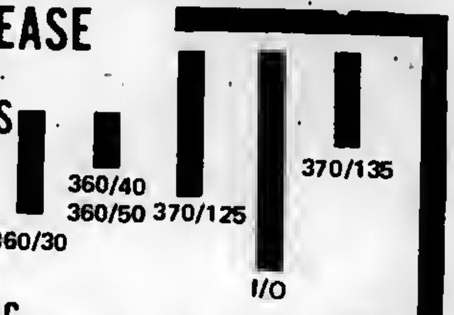

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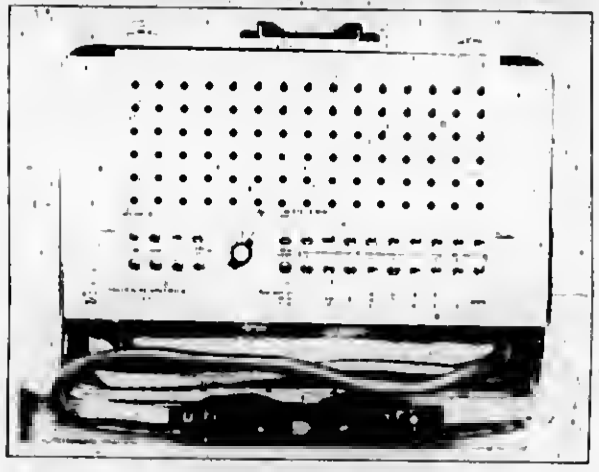

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A meeting of the full Study Panel on December 5 at the same location will consider this and other subjects relating to State contracting including socio-economic policies, and termination, delays and liquidated damages.

Interested persons may secure copies of the discussion papers by writing the Project Office at 915 Capitol Mall, Room 538, Sacramento, 95814, or by calling (916) 322-5184.

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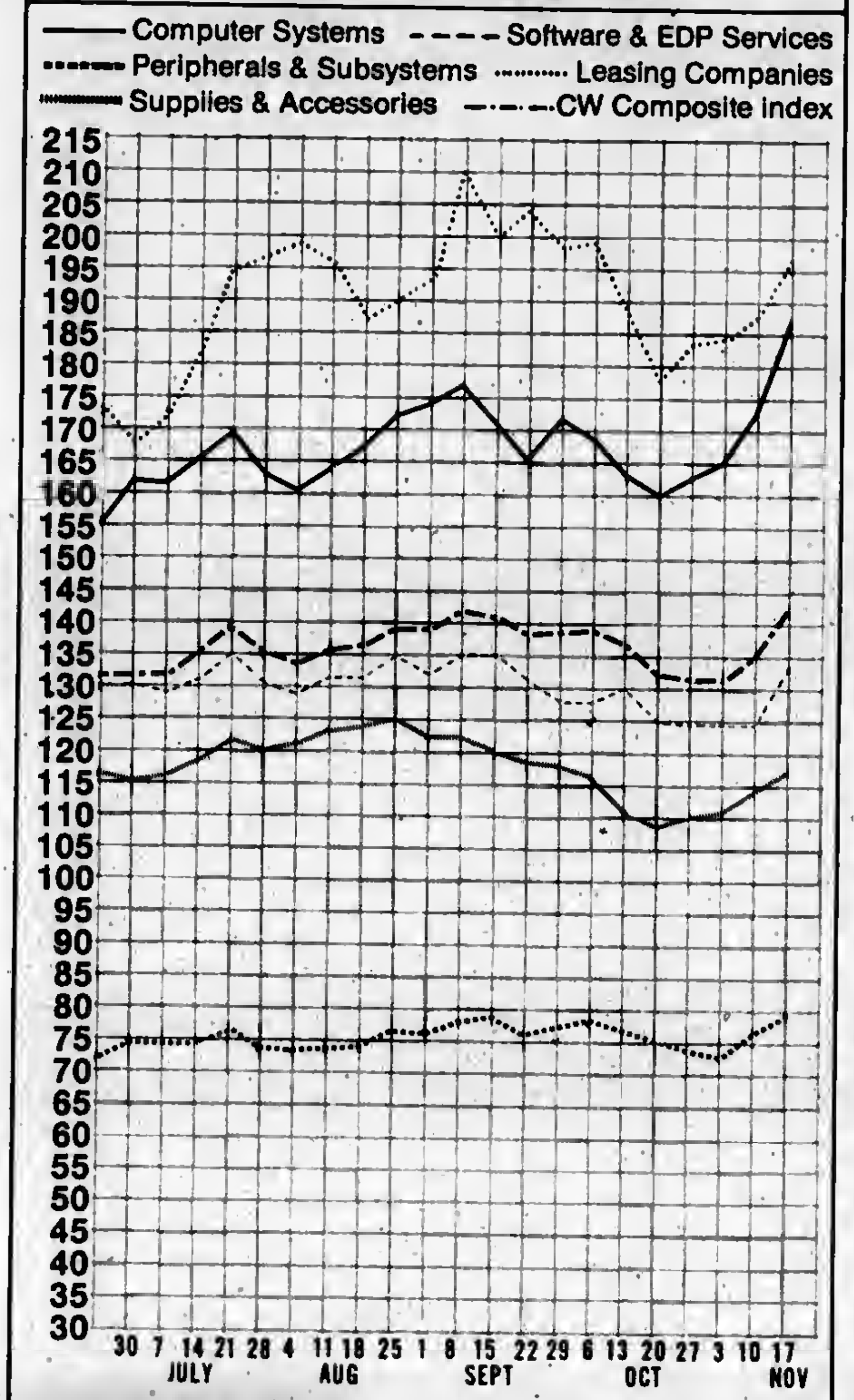

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CONTROL DATA
Three Months Ended Sept. 30

	1977 (000)	1976 (000)
Shr Ernd	$.93	$.87
Revenue	372,506	329,084
Spec Cred	400	350
Earnings	15,992	14,997
9 Mo Shr	2.45	2.12
Revenue	1,080,532	970,782
Spec Cred	700	600
Earnings	42,286	36,884

DATA GENERAL
Year Ended Sept. 24

	1977	a1976
Shr Ernd	$2.8	$2.11
Revenue	254,687,000	178,753,000
Earnings	28,579,000	20,780,000
3 Mo Shr	.99	.78
Revenue	67,544,000	63,543,000
Earnings	9,868,000	7,463,000

a-Restated to include Digital Computer Controls, Inc., Acquired on pooling-of-interests basis.

DATAPRODUCTS
Three Months Ended Sept. 24

	1977	1976
Shr Ernd	$.50	$.38
Revenue	31,818,000	28,181,000
Earnings	3,797,000	2,854,000
6 Mo Shr	.94	.83
Revenue	61,830,000	54,861,000
Earnings	7,118,000	a6,228,000

a-Includes $1,118,000 gain on sale of building.

DOCUTEL
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	.....	$.20
Revenue	$7,815,000	8,287,000
Tax Cred	.....	254,000
Earnings	(358,000)	511,000
9 Mo Shr	.....	.70
Revenue	21,471,000	24,837,000
Tax Cred	.....	686,000
Earnings	(561,000)	1,811,000

COMPUTER PRODUCTS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.17	$.08
Revenue	2,401,732	1,522,430
Earnings	246,640	118,200
9 Mo Shr	.42	.25
Revenue	8,406,596	4,318,723
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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 16, 1977

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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	42 1/4	0	0.0
M	BURROUGHS CORP	55- 91	68 7/8	+3 1/2	+5.3
O	COMPUTER AUTOMATION	18- 30	26 3/8	+1 3/4	+7.1
N	CONTROL DATA CORP	20- 26	25	+4	+19.0
O	CRAY RESEARCH INC	15- 29	25	+ 1/2	+2.0
N	DATA GENERAL CORP	35- 52	51 3/4	+3 3/4	+7.8
N	DATAPOINT CORP	18- 37	36 5/8	+2 3/8	+6.9
N	DIGITAL EQUIPMENT	37- 53	48	+2 3/4	+6.0
N	ELECTRONIC ASSOC.	2- 3	2 3/8	+ 1/4	+11.7
A	ELECTRONIC ENGINEER.	8- 12	11 5/8	+2	+20.7
O	FOUR-PHASE SYSTEMS	13- 19	19 3/8	+1	+5.4
N	FOXBORO	41- 54	43 3/4	+1 5/8	+3.8
O	GENERAL AUTOMATION	6- 9	7	+ 3/4	+12.0
O	GRI COMPUTER CORP	1- 1	3/4	+ 1/8	+20.0
N	HEWLETT-PACKARD CO	69- 87	75 1/2	+3 1/4	+4.4
N	HONEYWELL INC	43- 55	49 3/4	+4	+8.7
M	IBM	245-286	257 7/8	+5 1/8	+2.0
O	MANAGEMENT ASSIST	5- 9	8 5/8	0	0.0
O	MICRODATA CORP	7- 18	11 1/2	+ 3/8	+3.3
O	MODULAR COMPUTER SYS	5- 9	9 1/8	+1 1/2	+19.6
N	NCR	32- 47	43 5/8	+2 1/4	+5.4
O	PRIME COMPUTER INC	12- 23	20 7/8	+1 1/4	+6.3
N	PERKIN-ELMER	17- 22	20 1/4	+1	+5.1
N	RAYTHEON CO	16- 33	32 7/8	+2 1/2	+8.2
N	SPERRY RAND	30- 42	34 7/8	+1 1/4	+3.7
O	SYCOR INC	8- 15	15	+ 1/4	+1.6
A	SYSTEMS ENG. LABS	5- 8	8 3/8	+1 3/8	+19.6
A	WANG LABS.	10- 14	12 5/8	+1 1/2	+13.4

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	+ 1/8	+2.8
O	BOOTHE COURIER CORP	8- 10	11 5/8	+1	+9.4
O	COMDISCO INC	10- 14	13 1/2	+2 5/8	+24.1
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	6- 9	9 1/8	+1	+12.3
N	ITEL	13- 22	20	+1 5/8	+8.8
M	LEASCO CORP	19- 27	25 3/8	+ 1/4	+0.9
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 15	15	+1 1/8	+8.1

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	3/4	+ 1/4	+50.0
O	AMACOMP INC	7- 10	8 3/4	0	0.0
A	APPLIED DATA RES.	5- 10	7 3/4	+ 1/2	+6.8
N	AUTOMATIC DATA PROC	23- 30	28 1/2	+1 7/8	+7.0
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	12 1/4	+1 1/2	+13.9
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	10	- 1/8	-1.2
N	COMPUTER SCIENCES	7- 9	8 1/4	+ 1/8	+1.5
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 5/8	+ 1/4	+18.1
O	COMSHARE	5- 8	7 1/2	+ 1/2	+7.1
O	DATA DIMENSIONS INC	3- 5	3 7/8	0	0.0
O	DATATAB	1- 2	1 1/8	- 1/8	-10.0
N	ELECTRONIC DATA SYS.	14- 20	16 1/8	+ 1/2	+3.1
O	INSYTE CORP	2- 3	1 3/8	+ 1/8	+10.0
O	IPS COMPUTER MARKET.	1- 2	2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	0	0.0
A	LOGICON	7- 17	13 3/4	+2 1/8	+18.2
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 14	14 7/8	+ 3/8	+2.5
O	NATIONAL DATA CORP	4- 7	6 7/8	+ 3/4	+12.2
A	ON LINE SYSTEMS INC	16- 22	18 3/4	+1 3/4	+10.2
N	PLANNING RESEARCH	3- 6	4 1/4	+ 1/4	+6.2
O	PROGRAMMING & SYS	1- 1	3/8	+ 1/8	+50.0
O	RAPIDATA INC	2- 3	2 1/2	0	0.0
O	REYNOLDS & REYNOLD	17- 20	18 3/4	+ 3/4	+4.1
O	SCIENTIFIC COMPUTERS	1- 4	4	+ 1/2	+14.2
O	TYMSHARE INC	14- 23	22 7/8	+3 1/4	+16.5
A	URS SYSTEMS	4- 5	4 5/8	- 1/8	-2.6
N	WYLY CORP	1- 2	3/4	+	+8.3

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	14 3/4	+1 1/2	+11.3
O	ADVANCED MEMORY SYS	7- 9	8	+1 1/4	+18.5
N	AMPEX CORP	8- 11	9 3/4	+ 5/8	+6.8
O	ANDERSON JACOBSON	3- 5	4 5/8	+ 3/8	+8.8
N	APPLIED DIG DATA SYS	10- 20	14 1/8	+ 5/8	+4.6
O	BEEHIVE INT'L	5- 12	6 1/2	+1 3/8	+26.8
A	BOLT,BERANEK & NEW	7- 9	7 1/2	+ 1/4	+3.4
N	BUNKER-RAMO	8- 12	11 7/8	+1 5/8	+15.8
A	CALCOMP	3- 5	2 3/4	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	2 3/4	- 1/8	-6.2
N	CENTRONICS DATA COMP	20- 30	21 5/8	+1 3/8	+6.7
O	COGNITRONICS	1- 1	7/8	+ 1/8	+16.6
O	COMPUTER COMMUN.	5- 8	6 1/2	+ 1/4	+4.0
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3 1/8	+ 1/8	+4.1
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
O	COMTEN	9- 13	10 3/8	+ 5/8	+6.4
N	CONRAC CORP	19- 28	21 7/8	+1 1/4	+6.0
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 9	8 7/8	+ 1/4	+2.8
A	DATA PRODUCTS CORP	9- 17	17 1/8	+ 5/8	+3.7
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2	+ 3/8	+23.0
O	DECISION DATA COMPUT	2- 3	2	+ 1/8	+6.6
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	9	- 1/4	-2.7
O	DATARAM CORP	2- 12	11	- 1/2	-4.3
M	ELECTRONIC M & M	4- 5	4	+ 1/2	+14.2
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/8	+ 1/8	+12.5
N	HAZELTINE CORP	8- 12	10 3/8	+ 3/4	+7.7
N	HARRIS CORP	28- 44	41 3/4	- 1/8	-0.2
A	INCOTERM CORP	10- 19	18 7/8	+1 3/8	+7.8
O	INFOREX INC	4- 7	5 1/4	+ 1/8	+2.4
O	INFORMATION INTL INC	9- 14	9 1/4	0	0.0
O	INTEL CORP	38- 57	46	+1	+2.2
A	LUNDY ELECTRONICS	3- 6	3 7/8	- 1/4	-6.0
O	MSI DATA CORP	6- 13	13 3/8	+1 1/8	+9.1
O	MEMOREX	23- 34	29 3/4	+3 1/4	+12.2
N	MOHAWK DATA SCI	5- 8	5 7/8	- 1/8	-2.0
O	PENRIL CORP	2- 5	5 1/8	+ 1/4	+5.1
N	PERTEC CORP	7- 10	9 3/8	- 3/8	-3.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	3- 5	3 1/8	- 1/8	-3.8
O	RECOGNITION EQUIP	6- 10	7 5/8	+ 1/4	+3.3
O	SCAN DATA	1- 2	7/8	-	-6.7
O	STORAGE TECHNOLOGY	10- 19	18 1/4	+ 1/8	+0.6
O	T BAR INC	7- 13	12 5/8	+ 5/8	+5.2
O	TALLY CORP.	4- 6	4 1/4	+ 3/4	+21.4
A	TEC INC	7- 10	7 3/8	+ 1/2	+7.2
N	TEKTRONIX INC	29- 40	39 5/8	+2 1/2	+6.7
N	TELEX	2- 3	2 5/8	0	0.0
O	WILTEK INC	1- 1	5/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 16 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 7/8	+ 1/2	+7.8
O	BALTIMORE BUS FORMS	1- 4	1 1/8	- 1/8	-10.0
A	BARRY WRIGHT	10- 14	13 5/8	+ 1/4	+1.8
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 7/8	+1 1/8	+6.7
N	ENNIS BUS. FORMS	6- 7	5 7/8	+ 1/8	+2.1
O	GRAHAM MAGNETICS	11- 17	17 1/4	0	0.0
O	GRAPHIC CONTROLS	13- 18	15	+1	+7.1
N	3M COMPANY	44- 56	49 1/2	+1 1/8	+2.3
O	MOORE CORP LTD	24- 37	26	+ 1/2	+1.9
N	NASHUA CORP	16- 28	19 1/4	- 7/8	-4.3
O	STANDARD REGISTER	18- 25	22 1/2	+1	+4.6
O	TAB PRODUCTS CO	10- 19	9 3/4	+ 1/4	+2.6
M	UARCO	18- 22	21	+1 3/4	+9.0
A	WABASH MAGNETICS	10- 15	14	+1	+7.6
N	WALLACE BUS FORMS	17- 21	19 1/2	+1	+5.4

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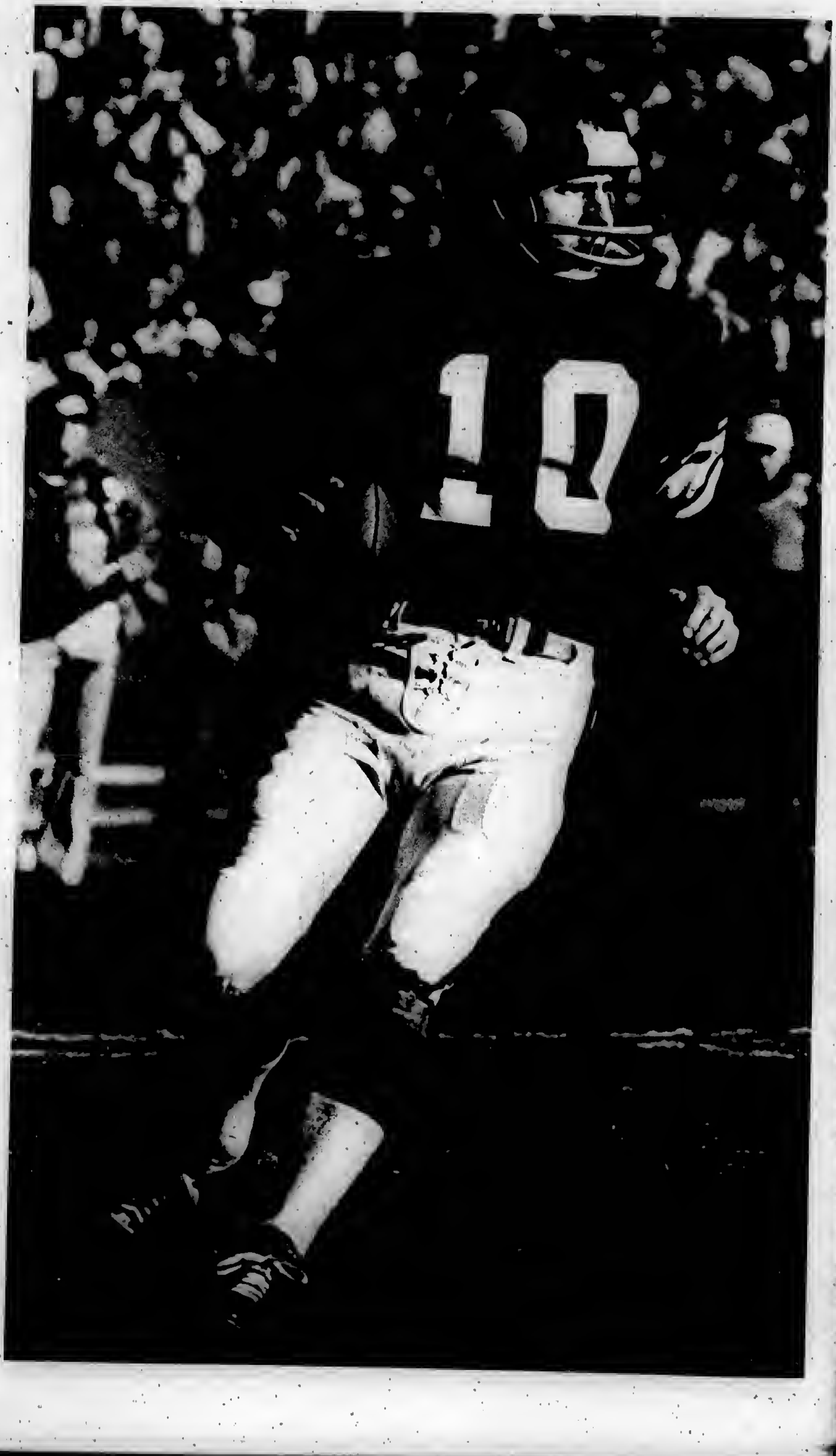

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Wake Up: Packet Nets Now a Reality

By Ronald A. Frank
CW Staff

ANN ARBOR, Mich. — Emerging network architectures like IBM's Systems Network Architecture (SNA) and Digital Equipment Corp.'s Decnet can ultimately coexist with public packet networks in the same user systems if vendors make the required interfaces compatible within their equipment, according to Dr. Dixon Doll, a communications consultant here.

DP equipment vendors do not yet believe the public packet nets are real and have done little to meet the users' needs in this area, Doll said in a recent interview.

The recent implementation of an SNA interface by IBM World Trade for the Datapac network in Canada and the Transpac network in France points up the unnecessarily complicated manner in which the vendors are approaching packet problems, Doll said.

The IBM Network Interface Adapter (NIA) in the SNA implementations generates a polling routine to make a Model 3270 CRT think it is talking to a 3705 front end when in actuality it is being interfaced with the network.

CW Special Report on Data Communications Networks follows Page 48.

The NIA takes information from the terminal and translates this into the Higher Level Data Link Control (HDLC) protocol for transmission over the packet network. At the other end of the network, a 3705 attached to a 370 or other IBM mainframe contains a software ex-

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NEWSPAPER

New Standard of Professionalism?

Judge Rules DPers Open to Malpractice Claims

By Ann Dooley
CW Staff

NEW YORK — Computer specialists and their clients have a "special relationship" which may make the DPers liable for their actions even years after a contract has ended, a federal court judge ruled here recently.

District Court Judge Constance Baker Motley held that DP professional liability is comparable to that of an architect or an accountant and subject to malpractice claims by a client.

The ruling came during a pretrial hearing of the F&M Schaefer Brewing Co. suit against Electronic Data Systems Corp. (EDS) which claims EDS did not fulfill its contract to supply Schaefer with DP services under a facilities management contract.

The decision may set a new standard of professionalism for the DP community, some observers said last week.

Since DP uses a special language, a client cannot give informed consent to DPers' work, Motley indicated. Even when a client approves a system, therefore, it may have done so without full understanding, she said.

The client must rely on the advice and knowledge of the DP expert, and this is the basis of the special relationship between the two, the judge explained.

Because of this relationship, any fraud or negligence which occurs might not be discovered until the continuing treatment had ended, she added.

While the statute of limitations would normally prohibit any legal action after a certain number of years dating from the beginning of the contract, the statute of limitations for a client under continuing treatment would begin only after the relationship had ended, she noted.

The Schaefer defense will probably now move from a claim of contract fraud to what the professional duties of a system designer include, sources close to the case said. In proving a special relationship, Schaefer will have to show it had no knowledge of what EDS was doing with the system it was running for the brewer.

EDS, on the other hand, is contending that Schaefer employed DP experts and that the two companies were engaged in a business relationship and not a profes-

(Continued on Page 3)

Concern Reaches White House

Fears of FBI Switch Plan Grow

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Both the White House and the Office of Technology Assessment have been asked to review the Federal Bureau of Investigation's plan to switch criminal histories between the states and federal users through the National Crime Information Center (NCIC) here.

"Creation of a national police force and a national data bank are what is at issue here," Rep. John E. Moss (D-Calif.) said in a letter to the President's Office of Science and Technology Policy.

The message-switching proposal, devised by the Justice Department and the FBI, may be chosen for study by the Domestic Presidential Review Memoranda, a White House mechanism created by the Carter Administration to examine important policy issues. The White House is still considering the matter.

At the request of two congressmen on the House Judiciary Committee, Chairman Peter W. Rodino Jr. (D-N.J.) and Don Edwards (D-Calif.), Congress' Office of Technology Assessment (OTA) will also look into the plan during a complete evaluation of NCIC.

OTA has already established an informal working group of outside experts and inside staff to study NCIC. The group held its first meeting at the beginning of November, a spokesman said.

(Continued on Page 6)

IBM Offers Graphics Unit Manufactured by Sanders

By Ronald A. Frank
CW Staff

WHITE PLAINS, N.Y. — IBM will sell, support and maintain a complete terminal system manufactured by Sanders Associates, Inc. as a direct result of the antitrust settlement the two firms reached last January.

IBM's announcement of the Model 3250 graphics display system is believed to mark the first time the mainframer has introduced a complete terminal system produced by another vendor.

The 3250 can reportedly connect and display any series of 1,024 addressable points on a CRT screen at the rate of 350K in./sec. It is an upgrade for the IBM 2250 Model 3 and was designed primarily for use by engineers and draftsmen in graphics design environments.

Designed by Sanders "under the direction of IBM's Systems Communications Division in Hursley, England," the 3250 is the first product to

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Bundled Pricing Illegal, 1968 IBM Memo Admits

By Catherine Arnst
CW Staff

NEW YORK — IBM officials apparently recognized as early as 1968 that tying in software and services with the price of a CPU was illegal under U.S. antitrust law although the announcement to unbundle was not made until June 23, 1969.

IBM memoranda supporting this charge were entered into the U.S. vs. IBM antitrust trial records here recently in spite of IBM efforts to keep them out of the public eye.

These documents, which describe the alternatives and strategies the firm considered in attempting to rectify the tie-in situation before it was forced to do so by legal action are part of a group of documents on which IBM claimed attorney-client privilege in an attempt to keep them out of the government's hands [CW, Nov. 7]. These claims were all ultimately overruled by the trial judge.

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Doll to Vendors: Packet Networks Now a Reality

(Continued from Page 1)

tension to the Network Control Program (NCP) to implement X.25 Level 2 and Level 3 protocol functions, Doll explained.

Polling operations normally generated at the 3705 are moved out to the NIA at the terminal because polling is not a viable procedure through a packet net, he said. Polling messages would look like data messages and the delay would be unpredictable; in addition, the user would be paying for each poll and control message, he added.

User Pays for Everything

Under presently announced capabilities, the packet net user with an SNA system who decides not to use a private line network has to pay for all the IBM teleprocessing functions including the Virtual Telecommunications Access Method (Vtam), NCP, the 3705 software extension and the NIA. All these costs are based on the vendor's decision to duplicate many of the packet network control functions, Doll said.

The real channels to which the packet net user is connected are very intelligent logical facilities. The vendor would never require the user to pay for such a cumbersome network capability if the vendor acknowledged the provision of intelligent network control functions by the packet carrier, he said.

IBM is actually trying to make minimal changes to the basic private line approaches of SNA, resulting in a minimal need to change any hardware or software already in place, according to Doll. The results of this methodology are high costs, less efficiency and more duplicated functions than if the vendor were to design for the packet capability from the start, he contended.

As evidence of a more streamlined vendor approach, Doll called attention to the Raytheon packet implementation which incorporates NIA-type functions and normal 3270-type terminal capabilities combined into one controller.

Key Question

The key question in this situation, Doll pointed out, is who will provide the intelligence necessary to interface terminal equipment and mainframes to the public packet nets. If the vendors do not, then it will be left to the carriers to do so.

Short-term attempts to interface existing data communications systems to the packet nets using the IBM methodology will be "totally unworkable over the long term," Doll said.

One of the factors holding back major commitments by the vendors is that portions of the proposed X.25 standard are still not finalized. Some of these issues will have to be resolved before the vendors make major decisions, he said.

IBM recognizes there are certain inadequacies with its present approach, but until the structure of the marketplace and the interface standards become more crystallized, it is reluctant to make major changes in its main SNA products like NCP and Vtam, he added.

If IBM understood that users are not going to accept the packet/SNA interfacing approach announced thus far, it would come up with a more efficient packet net interface with less software and less complex NCP and Vtam functions. Rather than duplicating many of the functions now provided by the carriers, a more efficient interface would include only those capabilities not handled by the carriers, he said.

Until the U.S. packet carriers like Tymnet and Telenet become a major factor, however, IBM will not provide network interfacing for domestic users, Doll believes. IBM is also carefully watching to see what capabilities AT&T will provide with its Bell Data Network (BDN), he said.

If BDN does not provide compatible interfacing with X.25 networks, somebody else will have to develop this capability, Doll predicted.

IBM Hikes Rental, Lease Fees

ATLANTA — IBM has increased the rental and lease prices for such equipment as the System 32, System 7 and some models of the System 3 line by approximately 5%.

Also included in the price increases are I/O gear for the systems, unit record equipment and most program licenses, the firm's General Systems Division said.

The System 3 models affected include the 4, 6 and 10. Rental and lease rates for the models 3741 and 3742 data entry devices are also up, as is the rental rate for the 029 keypunch.

For example, the System 32-A1 rental was $748/mo and has been increased to $785/mo; the top-of-the-line System 32-C44 was increased from $1,483/mo to $1,557/mo, the firm said.

The 3/10-42 was $393/mo and has gone to $411/mo, with the 3/10-A17 rising from $1,770 to $1,854.

The company said the price increases reflect "a normal business review."

Catamore Case Gets Trial Date

PROVIDENCE, R.I. — Judge Francis Boyle has set March 3 as the date for commencing the second round of the trial involving Catamore Enterprises, Inc. and IBM.

The new trial was ordered by the U.S. Court of Appeals in Boston on the grounds the jury was erroneously allowed to find written and oral contracts valid at the same time [CW, Oct. 4, 1976]. The appeals court also cited a statute of limitations.

The original jury judgment ordered IBM to pay Catamore $11.4 million and Catamore to reimburse IBM $68,453.

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Technique Applicable to Disks

Phone Company Salvages Tape's Erased Data

By Brad Schultz
CW Staff

STOUGHTON, Mass. — Information accidentally erased from magnetic tape was successfully recovered by a Western U.S. telephone company, using a method created here by a small instrumentation firm.

First developed about five years ago for use with analog tape, the method was applied this year to the phone company's digital tape containing toll call records.

When interviewed, the phone company spokesman requested that his company's name be withheld as a matter of policy, not wanting to appear as especially endorsing the method's proprietor.

The method employs very low noise amplifiers and special playback techniques and is based on evidence that recorded magnetic tapes usually retain some residual signal level — even after intensive erasure, according to its developer, Wesley Tannenbaum of Sysco Engineering Corp.

Sysco has been able to recover data from erased tape at sufficient signal-to-noise levels to enable a successful readout of the data, Tannenbaum explained.

"The process then is to re-record the low level 'readout data' on another tape so that the user can play back the data on an ordinary tape machine or a computer playback tape machine as the case might be," he said — noting, however, that data usually cannot be recovered if a new similar type of recording has been made over the erased data.

Tannenbaum described the method as perfected and reliable and said it is applicable to recordings on other magnetic media, such as disks.

Sysco Engineering Corp. is a small producer of customer instrumentation systems, founded in 1965 by Tannenbaum, who is president. The firm has five employees and annual sales that fluctuate from zero to $100,000, according to Tannenbaum.

Prior to his telephone company contract, Tannenbaum had emphasized the method's capability for enhancing weakly recorded tape, rather than recovery of erased information.

Only Alternative

The telephone company approached a number of firms — including some well-known electronics and communications companies — before locating Sysco, the spokesman explained, but no one else seemed to be able to recover the data from the company's accidentally erased tapes. The small, relatively unknown Sysco was found to be the only alternative.

The spokesman seemed satisfied with Sysco's service, despite his reluctance to be identified.

Tannenbaum said he knows of no place else in the U.S. having this recovery capability.

The cost of the service depends upon the extent of the erasure, the quantity of tape involved and the specialization of the equipment needed to run the tape, Tannenbaum explained. For example, he said, the price for recovering erased information on one reel of 1/2-in. computer tape would probably be about $2,000.

DPers Liable For Malpractice

(Continued on Page 1)

sional one.

Schaefer originally brought suit charging EDS with designing a faulty computer system [CW, Sept. 13, 1976] and has now added malpractice claims to its charges. It also claims the statute of limitations for such suit has not expired because of the "professional" nature of their relationship.

EDS is claiming that malpractice does not apply because the statute of limitations has expired.

Since data processing is a complex field that the ordinary person does not understand, DP people will have to exercise a certain standard of care when dealing with non-DPers, Schaefer attorney Thomas Christo told the court.

In the future, DPers may have to be careful of offering advice, even under the Good Samaritan rule of helping out a neighbor with his system, one DP expert later said, since it's possible the DPer could be held liable for such advice.

Although the judge inferred that a special relationship is possible in data processing, she has not taken the position that this is true in the Schaefer case and will wait for the trial to make that decision.

In order to give both parties time to prepare for the new developments, the trial was postponed until April 10.

Adapso Sets Tax Meet

NEW YORK — An opportunity to discuss the recent decisions of the New York State Tax Commission [CW, Nov. 21] and their implications for the data processing community will be offered Dec. 5 at 1:30 p.m. at the New York Hilton here.

More information is available from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

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Software Protection 'Insignificant'

By Brad Schultz
CW Staff

CAMBRIDGE, Mass. — The typical software company is not especially concerned with protecting its software, and — to the extent that it is — would rather rely on physical, technological and contractual protection than on legal controls, a report by Harbridge House, Inc. of Boston has concluded.

Prepared under a contract with the National Commission on New Technological Uses of Copyrighted Works (Contu), the report said the typical company "may — just 'may' " take advantage of offered legal protection, but would not be deterred from developing or marketing new programs in the absence of protection.

Although this is likely to change as the typical company grows, the issue of legal protection of software through a grant of limited monopoly is, for the most part, of "monumental insignificance to the industry," the report said.

In seeking its data, Harbridge House mailed questionnaires to software industry executives and also relied on a questionnaire published in the July 11 issue of *Computerworld*.

The volume of responses to the survey completed with the cooperation of Applied Data Research, Inc. and the Association of Data Processing Service Organizations, Inc. as well as *Computerworld* was greater than anticipated, according to Richard I. Miller, director of the study entitled "Legal Protection of Computer Software: An Industrial Survey.".

More than 38% of the executives responded to the mailed questionnaire in contrast to the expected 15% to 20%, Miller said in remarks at the Contu meeting (see story on Page 5).

Miller described the typical respondent as being the president of his company, which is independently owned and less than 10 years old, has fewer than 100 employees, annual sales of under $5 million and spends less than $100,000 annually on research.

One of the survey question asked respondents to indicate their use of various techniques including patents, copyrights and trade secrets to protect software and to state their assessment of each one's effectiveness on a scale of 0 to 5, with 0 representing "not at all effective" and 5 representing "completely effective."

Thiry percent of the survey respondents answered the question; another 20% indicated the question was "not applicable." Fifty percent replied they did not know or did not answer.

Of those answering, 82% rated patents as "not at all effective" with the balance — 18% — calling them "fairly effective."

As for copyright protection, 55% rated the copyright "not at all effective," with 5% calling them somewhat effective, 15% considering them "very effective" and another 15% calling them "completely effective."

Trade secrets were found to be "not at all effective" by 29% of the respondents, "rarely effective" by 5%, "somewhat effective" by 14%, "fairly effective" by 24%, "very effective" by 14% and "completely effective" by 14%.

In the area of use, however, patents were reportedly used to protect software by only 5% of the respondents, copyrights by 20% and trade secrets by 21%.

Many respondents were reacting instinctively, Miller suggested, and were therefore not relying on actual experience in litigation, of which there has been relatively little so far.

Term Extended

WASHINGTON, D.C. — A bill extending by seven months the term of the National Commission on New Technological Uses of Copyrighted Works (Contu) was signed by President Jimmy Carter here recently.

Contu now has until July 31 rather than Dec. 31 to submit its final report to Congress and the President.

IBM Memo Admits Bundling Illegal

(Continued on Page 1)

According to these IBM memoranda, the firm was prompted to unbundle to some degree by the threat of several lawsuits as well as by the Department of Justice (DOJ) investigation, which started in 1967. In a document dated Dec. 18, 1968, IBM assistant treasurer Hillary Faw wrote that legal counsel for the firm "has asserted that those services represent an illegal and indefensible tie-in sale under the antitrust laws of the United States."

IBM Brass Knew Tie Illegal

IBM executives had already reached this conclusion in September of that year, according to Faw — a prolific writer of memos later subject to IBM privilege claims. At a Steering Committee Meeting held Sept. 9, 1968, during which bundling alternatives were discussed, the IBM executives who attended "achieved unanimity on [the] existence and illegality of the tie," Faw wrote.

Aware of the market power gained from bundled pricing, "IBM retained the bundled environment for as long as possible. Its intent in doing so ... was to exclude competition and retain the ability to control prices," the government charged in its pretrial brief.

IBM set up a task force to analyze the bundling situation and available alternatives in 1968, and Faw suggested himself as chairman because "[I] have personal experience in dealing with DOJ investigation officials on the intimate details of the IBM Corp. [I] know better than anyone else the extent to which DOJ can be confused or misled."

The task force prepared three reports for Cravath, Swaine & Moore, the firm's outside counsel and defense attorneys on the case. These alternatives were studied in the context of how they would affect IBM's profits, account control, competitors and customers.

But there also seemed to be recognition within the firm that by voluntarily unbundling portions of its package price, the firm could water down any legal threat to which it might be vulnerable. This attitude was displayed in one IBM document suggesting various alternatives to the "tie-in problem."

The idea was advanced that the Data Processing Division (DPD) could be broken into several geographic subdivisions, each one to be sold on a franchise agreement. This would have the effect of "throw[ing] sand in [the] eyes of DOJ ... [or would] make DOJ or [leasing companies] proceed against 100 to 150 independent dealers in order to break the tie."

In a memo outlining alternatives to bundling, Faw suggested that all systems engineering (SE) activities be priced separately, thus providing a "solution to the legal problem" but also causing "extreme disruption of business." However, if the firm only separately priced after-installation support, that might not provide a legal solution but "it would at lest buy time" and cause "less disruption" than the first suggestion, Faw wrote.

Selective Application

Faw also agreed with a government charge that the services supplied in the bundled price were applied selectively. "On a bundled price basis, we have the flexibility to direct these systems engineering guidance resources to where they will be doing the most good for IBM at any given time. Because we make no charge, we can apply or withdraw these resources essentially under our own control (Optimum employment of the squeaky wheel concept)."

Programs Not 'Products'

In order to justify its bundling practice, IBM emphasized internally that software programs should not be described as "products" because that would imply they could be priced separately, documents showed.

"We should recognize that discussing [applications] programs separate from the machines in advertising or presentations is inconsistent with our fundamental position that hardware and software including programs are an indivisible product," H. Bartow Farr of IBM's Legal Department wrote. "This inconsistency is not serious because our position is quite illogical to begin with," the attorney added.

In a later memo, Farr considered the legal implications of selling emulators, which were "primarily software," and Cravath's concern that "this erodes our defense that we are unable to price software." However, "my position has always been that of course we can price software and if our defense to unbundle depends on that fact, we are in desperate trouble," Farr said.

Once IBM decided to unbundle, it began to determine how best to deal with any adverse reactions it would encounter. Another Faw document, which the government claims was used at a May 6, 1969 Management Review Committeemeeting, suggested that the firm develop a "communications strategy" that was consistent with its "legal rationale and strategy."

"What we say can have a direct bearing on what we may be required to pay!" Faw emphasized, referring to possible efforts by leasing companies to obtain cash rebates after the unbundling announcement.

In this same memo, Faw summarized the reasons for IBM's decision to unbundle and the problems that would accompany that decision. One problem would be that "it seems to indicate awareness of [a] legal problem," he said.

However, IBM decided to unbundle "not withstanding our continued belief that timing was probably too soon (no structured market — uncertain business opportunty for software services at this time)" because it would "rather err by being too early than by holding [a] single price too long," he wrote.

When IBM did decide to unbundle software and services, it kept control programs as part of the bundled price. The adverse reaction of competitors to this move could be the assumption that "by keeping control programs in the bundle, IBM will continue to maintain a decisive lead time advantage over all independent software developers" and other competitors seeking to market IBM-compatible equipment, Faw warned.

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'Knowledge,' 'Information' Not the Same

Contu Told to Define Terms and Clarify Issues

By Brad Schultz
CW Staff

CAMBRIDGE, Mass. — A more precise definition of terms and further clarification of issues is needed before decisions can be made on how best to protect software, the National Commission on New Technological Uses of Copyrighted Works (Contu) was told at its 18th meeting here recently.

MIT Prof. Joseph Weizenbaum criticized the use of the terms "information" and "knowledge" as if they were interchangeable.

"I fear for our children when the distinction between information, knowlledge and wisdom is increasingly blurred," he said. Such terms as "program," "what we mean when we say 'something doesn't work.' " and "what a book says" compared with "what a computer says" should be well-defined and understood by the commission, he added.

Another MIT professor, J.C.R. Licklider, expressed agreement on the point, noting that some see a program as data while others see a program as operating on data.

A program is very much like a machine; when energized, both create process, Licklider said. One must know what a program is prior to knowing how to protect it.

Licklider said he was concerned about whether the commission is seeking to protect "the things which are really of value."

The Real Issue

Dr. Lee Burchinal of the National Science Foundation indicated that the issue in software protection, from a technical standpoint, is not in knowing who is using a system or program or data base, but in knowing what that person does with the material after accessing it.

The computer can know that a person has accessed it and for how long, but is generally blind to such possibilities as illicit hard copying of printed output, he explained.

In considering the need for data base protection, Weizenbaum pointed out that dynamic data bases — comprised of data which is frequently changing — generally run more risk than do static data bases — those having little or no change in constituent data (for example, a Table of Integrals).

The entity which deserves protection, however, is not just the data, but also the logic behind it, Weizenbaum continued.

Explaining why it would be "ill-advised" for someone to simply copy a program into a computer, Weizenbaum said programs must be maintained — a program which has run perfectly a number of times on a given system will inevitably develop bugs even on that system.

A program stolen in machine code form would be useless, he said, since machine code is peculiar to the machine.

Licklider remarked that "eavesdropping in people's files is not necessarily bad." As an example, he told of a research paper by another MIT colleague — Marvin Minsky — generally accessible throughout its development to other researchers via the Arpanet computer network.

Many who accessed the paper input their own criticisms and the paper turned out better in quality as a result, Licklider stated.

A number of individual presentations also heard by Commission members focused on either the current state or the future of computing.

Computer hardware cost-effectiveness was seen by Licklider as rising geometrically (that is, doubling every two years) between 1943 and 1999.

Licklider predicted that while software will not develop as rapidly as hardware, it will not hold back the development of hardware. The controlling factor in overall computer development will be legislation and people's attitudes, rather than inherent constraints in the technology, he said.

DP in Education

Personal computing and computer-assisted education were discussed by Dr. John Schoch of Xerox Corp.'s Palo Alto (Calif.) facility, where local high school students have turned out projects in computer art and graphics — for example, in film animation and machine simulation.

A film documentary of the students' work was presented, and Schoch suggested that, as minicomputer/graphics systems diminish in cost and physical size, such capabilities will enter the scope of personal computing.

Two economic factors which might retard future application of computer technology to libraries were mentioned by Prof. William Baumol of Princeton University and New York University and by Chuck Goldstein of the National Library of Medicine.

Baumol told the commission the cost of library storage and retrieval will consistently rise at a compounded annual rate — after inflation — of 5%.

Goldstein indicated the federal government's reticence in applying computer technology to its library operations might be attributed to fear of resultant layoffs.

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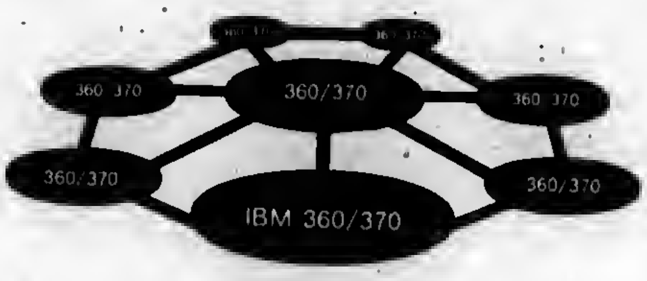

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IBM Unveils Graphics System From Sanders

(Continued from Page 1)

come out of the agreement between the two firms in which Sanders agreed to drop its antitrust suit against IBM in exchange for the right to develop "advanced computer-related products for IBM" [CW, Jan. 31]. Sanders has received an $18 million contract to build the 3250 for IBM.

The 3250 is similar to the type of display equipment that was the focal point in the Sanders-IBM lawsuit; earlier Sanders display equipment utilized some of the same IBM software that now operates with the latest display, according to industry sources.

As part of the antitrust settlement, IBM agreed to pay Sanders $4 million for application of Sanders technology to be used in future IBM products. Payment of $3 million by IBM was agreed on for "certain minimum production commitments" and another $3 million was paid to Sanders for the purchase of products from inventory.

Since settlement of the suit, the Sanders Data Systems Division has been sold to Harris Corp. But the 3250 will be manufactured by Sander's Federal Systems Division, which was not affected by the sale to Harris.

In keeping with established policies, neither Sanders nor IBM would comment on whether additional Sanders products will be introduced by IBM.

"IBM has had other companies manufacture products in the past," a company spokesman said, but added the firm would rather not give specific details about earlier agreements. An industry source, however, said it is believed the earlier agreements involved peripheral equipment and a software package from independent vendors.

Performance Details

The 3250 display system is said to provide faster image generation which in turn provides an increased amount of graphic and alphanumeric information that can be displayed. The 3251 display station includes a separate keyboard to allow the operator to call up program functions from an IBM 370 CPU.

The display provides three times more screen content than the earlier 2250, handles four character sets instead of two as on the 2250, adds lower case and the vertical display of alpha characters and has a blink feature when invalid data is entered, IBM said.

No change is required in basic programming when a user upgrades from the 2250 Model 3 to the 3250, but some additional programming may be required to handle lower case character display. The 2250 operated with four display units per buffer while the 3250 handles two displays and this may also require some modifications.

The 3250 includes a light pen and two keyboards. The light pen is used to indicate the position of lines, curves or arcs and it can be used to move sections of a display image within the 12-inch screen area.

An alphanumeric keyboard is used to enter design data, dimensions and so forth, while a 32-key program function keyboard allows special functions such as zoom or rotate to be handled in one keystroke. Eight programmable intensity levels are available on the screen with three under control of the light pen.

Software support is provided through the IBM Graphics Programming Service (GPS). GPS includes the Graphic Access Method (Gam) and the Graphics Subroutine Package (GSP), which runs under OS/VS1, OS/VS2 or VM/370.

A 3250 graphics display system is available on a purchase-only basis and consists of one or two 3251 display stations linked to a 3255 display control. Up to four of the display controls can be attached, at a maximum distance of 5,000 feet, to a 3258 control unit, which in turn is linked to a 370 processor.

The 3251 graphics display station may be purchased for $17,460, the 3255 display control for $37,200 and 3258 control unit for $39,750, IBM said, while a typical 3250 system, with four display stations, two display controls and a control unit may be purchased for $183,990. First deliveries are scheduled for the fourth quarter of 1978.

White House Study of FBI Plan Urged

(Continued from Page 1)

This latest wave of congressional concern over NCIC operations stems from letters written by Deputy Attorney General Peter F. Flaherty informing congressmen the FBI has been directed to continue the NCIC's Computerized Criminal History (CCH) program [CW, Oct. 17]. Further, the FBI has a mandate to come up with a comprehensive "blueprint" for a decentralized CCH program that would allow the states to maintain physical control over their own criminal history records.

Once this blueprint is approved by the Attorney General and Congress, Flaherty said, the FBI should acquire the necessary communications equipment to permit creation of a national CCH index and NCIC-CCH message-switching operations. The plan calls for the installation of this equipment before October 1978.

The Deputy Attorney General stressed that the Justice Department has no preconceived notions about what ultimate choices should be made for NCIC. "The goals which we shall be striving toward include identifying and implementing the type of system(s) which satisfy both the spirit of our constitutional democracy and the needs of our criminal justice community," he said in a letter to Moss.

Warning From Moss

Appealing directly to Attorney General Griffin B. Bell, Moss suggested that message switching "especially, but not conclusively in connection with CCH, has an importance far transcending its innocent and innocuous-sounding name.

"It relates to problems of preserving privacy and maintaining control over expansion of federal influence in state and local law enforcement in an age of increasing dependency on electronic communications," he stated.

In Moss' view, the proposed Justice-FBI plan only appears to be a process for decentralizing CCH records. "States would indeed retain physical control over the majority of their records, but state data banks would be interconnected with one another through the communications hub controlled by the FBI," he warned.

"State computer banks interconnected by NCIC message switching and augmented by the NCIC-CCH-multistate offender file is clearly a national data bank and should be recognized as such," Moss said.

Recalling that 10 years ago Congress gave a previous administration's proposal for a national data bank "a resounding denial" because of the potential abuse of such a powerful mechanism, Moss urged Bell to prevent the plan from going forward.

Edwards, who chairs the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, which has FBI oversight responsibility, told Justice he appreciated the fact that the department has no preconceptions concerning the resolution of various NCIC issue areas.

"My only preconceptions are to assure that security and privacy considerations are properly dealt with, that the system is cost-efficient and that the proper balance between federal and state responsibilities is struck," Edwards said.

Any effort to decentralize CCH records necessitates federal and state adoption of agreed-upon minimum standards to assure security, privacy, accuracy and completeness of information, Edwards stated.

Both Edwards and Moss questioned the need for an NCIC message-switching capability since the states already have an interstate message-switching service provided by the National Law Enforcement Telecommunications System (Nlets).

If it is found that the states are generally satisfied with the Nlets service for the timely exchange of such information as data on stolen vehicles or missing persons, non-CCH message switching by the FBI would not appear desirable or necessary, Edwards said.

With CCH decentralization, Nlets or a system like it could serve the states' needs just as efficiently: "The need for a speedy response certainly does not exist for CCH records, generally, as it does for non-CCH records, and that consideration deserves serious thought in determining the proper facility to handle this service."

Could Be Illegal

FBI switching of state-to-state communications may be illegal, both in terms of the law under which federal agencies can provide such services and under the FBI's authorizing statute, according to Moss. There is a specific prohibition against the FBI intruding in state and local law enforcement.

The congressmen also concurred that the NCIC Advisory Policy Board needs more independence from the FBI itself. The board's charter suggests it is no more than an arm of the FBI, unable to function in an independent advisory function, Moss said.

Edwards recommended that the FBI consider adding knowledgeable persons to the board who are not directly involved with NCIC, but who might be helpful in deciding security, privacy and technical issues.

The Justice Department has embarked on a study to assess state law enforcement needs, hoping to settle the question of whether the FBI should maintain CCH records or get out of this area. Four regions of the country have been selected for participation in this project, according to a staff member of the House Civil and Constitutional Rights Subcommittee.

The House subcommittee will hold further hearings on the FBI's message-switching plans and the federal role in state and local law enforcement; however, no dates have been set.

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Preyer Asks GAO for Major Survey

HEW Review of Security Sparks Call for More

By Edith Holmes
CW Staff

WASHINGTON, D.C.– The results of a Department of Health, Education and Welfare (HEW) review of its own computer security has prompted a congressional request for "an immediate examination" of computer security program effectiveness in all of the federal-government's major recordkeeping agencies.

Conducted from October 1976 through March 1977, the HEW review found that "DP systems security in HEW was far from meeting minimum acceptable standards."

HEW organizations were in compliance with only 55.6% of the standards devised by the department following the passage of the Privacy Act of 1974.

In addition, while a few HEW computer facilities approached full compliance with the minimum standards, the average level of organization compliance was only 36.9%, according to the internal report.

'Disquieting Findings'

"The task force findings are disquieting because they pertain to an agency with a longstanding commitment to the personal privacy of its clientele," Rep. Richardson Preyer (D-N.C.) said recently on the floor of the House of Representatives.

Suggesting the HEW computer security experience may be "commonplace" at best, Preyer informed the House he has asked the General Accounting Office (GAO) to examine the status of computer security at other major recordkeeping agencies.

Preyer, who chairs the House Subcommittee on Government Information and Individual Rights, complimented HEW for establishing security standards and initiating a self-assessment of complaince with them. He cautioned the department, however, not to lower its standards "as an easy way to achieve a seemingly higher level of compliance" with the Privacy Act requirements for safeguards.

HEW's DP systems security review task force, convened by the Assistant Secretary for Administration and Management, conducted 93 on-site reviews of department installations here and in 25 other U.S. locations.

Major problems identified by the task force included a lack of organized programs to ensure security; insufficient management control over systems development and maintenance; a lack of or inadequate contingency and disaster plans; and a lack of training in risk management.

The task force concluded HEW's Office of Management Analysis and Systems "should have supported the DP security program more aggressively" and "a need exists to review, update and reissue the DP systems security standards. Some organizations, for example, objected to the administration of an oath to prevent disclosure of information.

Certain standards, such as controls over the access to computers, need to be added to the HEW minimum compliance lists, the task force determined. Finally, the intent of some of HEW's computer security standards appears to have been misunderstood, the report stated.

In a letter to Preyer, HEW Secretary Joseph A. Califano Jr. said "reasonable" security would be an expensive, unrealistic proposition. "Rather, we need security measures which strike an appropriate balance between the potential risks and the resources required to protect systems against those risks," he wrote.

The HEW Secretary also expressed the concern that systems security be put into perspective with the department's other management priorities.

Califano has approved the task force recommendation that a vigorous corrective action program be implemented that would end violations of HEW computer system security standards by next October. The review of the standards themselves is already under way.

Along the lines of the task force's recommendations, the Assistant Secretary for Management and Budget has recruited a DP systems security officer for the Office of the Secretary.

In addition, the Social Security Administration (SSA) has reported it has corrected or is in the process of eliminating 85% of its violations of the HEW standards.

The Public Health Service, which scored a 69% compliance rate during the task force review, has initiated a coordinated effort to assure complete compliance with the standards.

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Picks Up Abnormal Sounds

Mini, Stethoscope Linked to Detect Aneurysms

By Brad Schultz
CW Staff

CINCINNATI — Researchers at the University of Cincinnati College of Medicine here have developed a means of detecting a cerebral aneurysm in a stroke-prone person before the aneurysm has ruptured.

Sounds indicating the presence of an aneurysm — a weak spot in a blood vessel — are detected by a special stethoscope outside the body, recorded and then analyzed by a minicomputer.

The sounds are caused by blood abnormally swirling through the weak, ballooning vessel, researchers at the medical school's Stroke Research Laboratory explained. Spasms or constrictions of a vessel, believed by many to be a factor in strokes caused by ruptured aneurysms, are recorded as a hum. The special stethoscope can detect these musical tones, according to Dr. Charles P. Olinger, a professor of neurology who heads the project team along with Jack F. Wasserman, Ph.D., a professor of engineering and research associate in neurology.

Olinger began his research seven years ago after realizing an aneurysm emits a musical tone that can be picked up by a microphone. He reasoned that investigators might be able to hear the sounds from outside a patient's head.

Wasserman, then a graduate student in engineering, began working on the problem with Olinger. The computer-based detection system was the result.

The system consists of a Hewlett-Packard Co. 21MX minicomputer with 32K (16-bit) words of memory, an HP 7900A dual-disk system, a Tektronix, Inc. 4012 graphics terminal, a Tektronix 4631 hard copier and a Biomation Corp. 8100 signal processor, according to a biomedical engineer in charge of the system. HP 5451 Fourier analysis software is employed to analyze the acoustic signals, according to the engineer.

A portable battery-operated stethoscope system records the signals for processing. Such examinations can be done in emergency wards, in outpatient departments or at the patient's bedside.

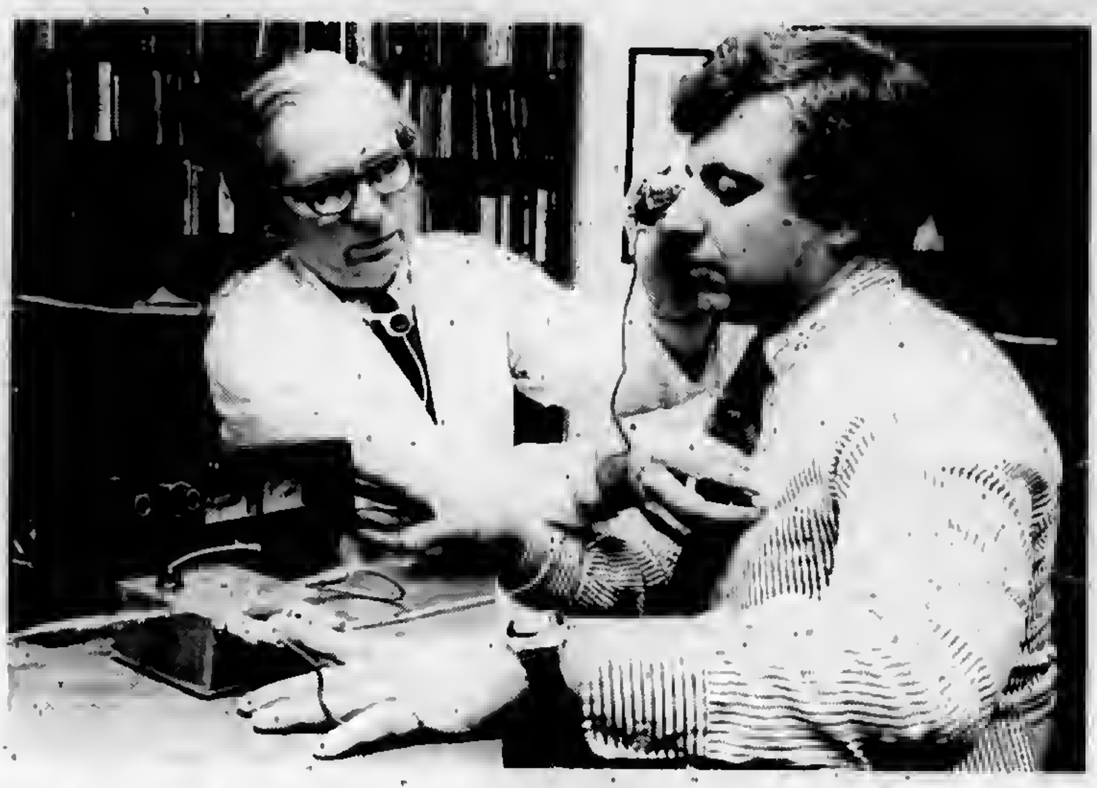
The process is not painful or discomforting to the patient, Olinger and Wasserman noted.

Olinger pointed out that stroke is the third most frequent cause of death in the U.S. and is often preceded by aneurysm formations. For every five patients with ruptured aneurysms left untreated only one will be alive and well at the end of a year, another will be disabled and three will be dead.

"The aneurysm problem is particularly frustrating since it is felt by many that almost half of the patients with intracranial aneurysms develop warning symptoms before a major rupture — in many cases, sudden onset of headache or dizziness," Olinger said.

Until the computerized stethoscope technique becomes generally available, the only method on hand for diagnosing the presence of an aneurysm is angiography, which involves injecting chemicals into the blood stream and x-raying the patient.

Angiography "entails expensive hospitalization, trauma and patient risk and therefore is not suited for investigating vague warning symptoms, even though these symptoms might precede fatal aneurysm rupture," Oligner said.



Olinger (left) demonstrates the stethoscope computer equipment on Wasserman.

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Kansans Building System To Assist Drug Prescription

By a CW Staff Writer

KANSAS CITY, Kan. — A computer system to assist physicians in prescribing drugs for their patients is being developed here at the University of Kansas Medical Center.

Funded out of the medical center's general teaching budget, the project's primary aim is to produce an educational tool for practicing physicians as well as medical students. However, the system is also conceived as an aid in routine drug prescription decision-making that will be available when perfected to the general medical community.

"This is a rapid way of getting doses and side effects of drugs, which really means better care of the patient in the long run," according to Dr. Stanley R. Nelson, professor of pharmacology. Nelson and his associates have been developing the system for about a year using an IBM 370/158 with the IBM Coursewriter III package.

"A terminal linked to our computer might be as valuable to a doctor as his *Physicians's Desk Reference* Book," Nelson said. "For example, a patient mght have a persistent cough. The doctor types in 'cough' on the terminal keyboard, and the system will display on a TV-like screen all the drugs used in treating coughs.

"The problem might be epilepsy. The doctor enters "epilepsy," and the system will ask him which of several types he is treating. He enters that name, and the computer lists the proper drugs and dosages."

Aside from offering physicians information on which drugs might be prescribed, the system will provide a means of studying side effects of prescribed medications, their interactions with one another and how the medications treat disorders.

Good for Groups

Physicians hundreds of miles away could access the medical center's CPU and thus use the system, Nelson indicated, noting that a group practice could rent a terminal for this purpose.

For users hundreds or thousands of miles distant, however, Nelson considers it more practical to store the software on cassettes and then send the cassettes to the users through the mail for implementation on their own hardware.

In building the data base of therapy recommendation, Nelson and his associates have been assisted by specialists in many fields of medicine. According to Nelson, the key problem at present is acquiring these recommendations and adding them to the data base.

The project team is eager to complete the project before "some vested interest groups" develop their own system of this type and then market it with some bias, Nelson said.

The project team is also cautious about delivering its system before having amassed a relatively full inventory of therapy information, since premature delivery might cause a number of physicians treating difficult cases and anxiously seeking therapy information to expand time, energy and money accessing the system only to discover no data available for their needs.

The project will take about one more year, before completion, he said.

Visa Head Says Public Will Never Go Cashless

SAN FRANCISCO – The idea of a cashless and checkless society "is an exercise in ego which the public will never accept," Visa credit card's president contended here recently.

"No such system has or ever will exist," Dee W. Hock, president of Visa U.S.A., Inc. told computer experts and financial officers attending a National Retail Merchants Association conference on data processing and communications.

Although acknowledging "an accelerating evolution in the exchange of value" by electronic impulse rather than paper, Hock asserted, "it will never replace paper. Customers will forever demand something more permanent as evidence of transactions than an ephemeral visual image on a terminal."

However, Hock noted that the number of credit card users is increasing by 30,000 per day and predicted that multipurpose cards like Visa will become "a worldwide device for the exchange of all forms of value wherever stored."

Hock called efforts to standardize electronic financial services "the most expensive, least effective, slowest way to utilize electronics."

Technology should be applied with a focus on specialization, he indicated, pointing out that DP systems are now geared to inventory control in retailing, to reservations control in the hotel and airlines industries and to transactions monitoring in the supermarket industry.

Real Challenge

"The real challenge is to connect elements owned and operated by retailers to those operated by financial institutions in order to better serve customers," Hock said.

Hock noted that Visa cards drawing on savings accounts, investments or other equities "unlock a value reservoir to which merchants have never had access, and the recent rush of savings banks, savings and loans associations and credit unions into the Visa system reflects their conviction that customers want a 24-hour-a-day, seven-day-a-week access to those resources from the point of sale."

He predicted that "investment houses, insurance companies, mortgage companies and other repositories of value will provide card access to the value reservoirs they hold.

"When cards such as Visa reach their full potential, they will identify a customer from anywhere in the world in full possession of all his assets, whether credit, deposit, investment, or equity — a customer ready to exchange them for whatever you sell," the retailers were told.

Customers "will pay well" in the long run for these services and about who provides them.

Two Seminars Aimed at Aiding Negotiation Skill

NEW YORK – Courses aimed at beefing up the legal, financial and psychological skills needed in contracting for DP products and services will be sponsored by both the ACT-Brandon Co. and the Management Research Corp.

"Computer Contract Negotiation," a three-day course offered by the ACT-Brandon Co., will address such questions as how to get the vendor to agree to negotiate to a nonstandard or expanded contract, what terms are really significant to the user's interests and how the user can position himself for effective negotiation.

Conducting the course will be Joseph Auer, a computer negotiator, Dick Brandon, an expert on computer contract negotiation, and Sidney Segelstein, a legal authority on computer contracts.

The seminars are scheduled for Dec. 5 in Washington, D.C., March 6 in Atlanta and June 5 in New York.

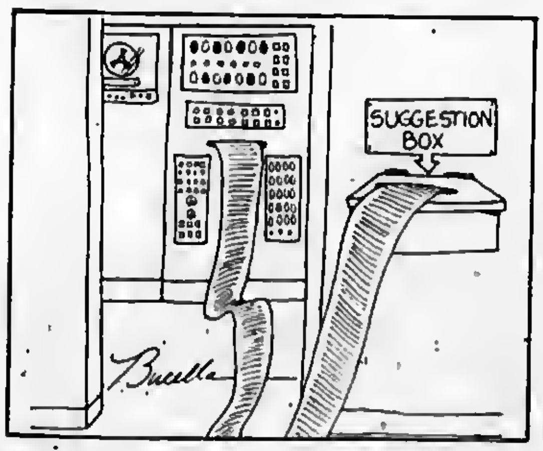
The registration fee, including course text, reference materials and copies of "Computer Negotiation Report," is $575. ACT-Brandon is at 437 Madison Ave., New York, N.Y. 10022.

Management Research Corp. will present "The Art of Negotiating," a two-day course that will base its approach on the idea that a person can succeed in making negotiations more productive by creating a solution in which both sides win.

The course will feature lectures and demonstrations by Gerard I. Nierenberg, founder of Negotiations Institute, Inc., and Richard A. Zeif, secretary to the institute.

The course will be conducted in Boston on Dec. 5 and in San Francisco on Dec. 8.

The registration fees are $450 for an individual and $395 for groups of two. Additional information can be obtained from the Management Research Corp., Sussex Building, 1430 Larimer Sq., Denver, Colo. 80202.



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Who this book is for

At the present time, there are thousands of COBOL programmers who are not writing structured programs. That means that the average COBOL shop can experience major gains in productivity by implementing an effective system of structured programming. As a result, this book is designed for the experienced COBOL programmer.

Although this book assumes familiarity with COBOL, it should also be of value to any data processing professional who comes into contact with programming projects, regardless of the language used. The chapters on design and documentation are largely independent of language considerations. And these chapters alone should justify the cost of this book.

4 reasons why this book is effective

1. The author, Paul Noll, has been a software specialist for a large company in San Francisco. He is currently responsible for the training of 250 programmers. As a result, his programming methods are superb, and his teaching methods are effective.

2. Paul never presents theory without showing its application. In contrast to other books and courses, this book is based around the development of four different kinds of business programs. Once you see how Paul's method is applied to these problems, you will forever see the value of structured programming.

3. This book is designed specifically for the COBOL programmer. As a result, you will see all of the structured coding techniques in COBOL (and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book; you'll see structured COBOL, program stubs, test plans, walkthrough agendas, and much more. In my experience, these illustrations, more than any other factor, determine whether an EDP course is effective . . . and they are the missing ingredient in other structured programming books and courses.

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HEW Critiques Medical Records Proposals

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Department of Health, Education and Welfare (HEW) "generally endorses" the protections devised by the Privacy Protection Study Commission for medical records.

Focusing on institutional records that "contain a substantial portion of the recorded health care information about individuals in this country," HEW said in a report to Congress that the privacy commission's recommendations could be implemented without creating major conflicts with existing state and federal law.

Further, the commission's proposals concerning these records would mean "a minimum of burden and paperwork for the institutions," HEW Secretary Joseph A. Califano Jr. wrote in a letter that accompanied the report to Congress.

Congress took HEW's views into account in revising legislation proposed by Representatives Barry M. Goldwater (R-Calif.) and Edward I. Koch (D-N.Y.) that would implement the privacy commission's medical record recommendations, according to a House subcommittee staff member. Koch's and Goldwater's H.R. 8283 has been replaced by H.R. 9989, which in turn has been incorporated into omnibus privacy legislation.

Additional laws protecting medical records are necessary "not because of a large number of improper disclosures and other abuses, but in the interest of bringing overall order to the scheme of statutory protection" and to strengthen existing safeguards against possible future abuse, Califano said.

Like the privacy commission, HEW avoided commenting on the confidentiality of records in the offices of private physicians, leaving such matters to state laws and organizations.

'Fair Handling'

In general, HEW proposed that legislation be passed to govern "the fair handling of medical records held by certain providers of health services." Fair handling would include requirements for patient access, correction by the patient, prohibitions on disclosure authority for disclosure without consent under some circumstances and standards for the content of patient authorization to disclose records.

"Adherence to these rules, for the records of all patients, would be required of medical institutions as a condition of participation in the Medicare and Medicaid programs," the report said.

Violations of any federal law concerning medical records would subject the institutions to loss of certification and to civil suits by individuals harmed by the violations, HEW added.

The department would like to see any federal law give HEW the authority to require medical care institutions, subject to survey and certification for participation in Medicare and Medicaid, to meet privacy standards regarding the records of their patients as a condition for initial and continuing certification.

"The vast majority of institutional medical records in the country would thus be subjected to the rules, since institutions certified for Medicare and Medicaid account for 95% of hospitals and at least 75% of long-term facilities which provide some nursing care," the report stated.

While it found the proposal "to extend these rules to all medical care assisted in any way by the federal government" appealing, HEW counseled Congress that such coverage "is too sweeping for effective management and enforcement at the present time." The department affirmed the privacy commission's belief that by tying medical record standards to Medicare-Medicaid certification, individual rights will receive "substantial protection."

HEW recommended that patients desiring a copy of their records be charged for the cost of reproducing it, but not for any search or preparation time the institution spends on it.

Agreeing with the commission that parents should not have access to the records of health care which minors have sought for themselves and received without parental knowledge or consent, HEW suggested that additional regulations governing access be handled by the department itself.

Prohibitions on Disclosure

The department agreed, with no additional comment, to the commission's recommendation on the means for correcting medical records. The commission's prohibitions on disclosure of these records, however, brought a host of remarks from HEW.

There are several "carefully chosen" situations in which institutions should be permitted to disclose patient records without consent, HEW maintained in its report. In these cases, authorization for release of the record by the individual would be irrelevant, would thwart an important public interest or would be inappropriate or unnecessary in some other way.

"Safeguards such as notification to the individual and accounting help assure that such disclosures are carefully controlled," HEW asserted. "In addition, when a record is originally established, the individual must be told of the possible uses that may be made of information about him without consent."

Medical record uses that should not require specific consent include consultation in the course of medical care; actions taken in an emergency health or safety situation; several types of research — particularly epidemiological and biomedical research — which study the course of a disease in the population; audit, investigation and evaluation of health care institutions; and fulfillment of public reporting statutes and lawful judicial and administrative processes, according to HEW.

"We recommend that an institution be permitted to disclose individually identifiable records for research purposes if it has made a reasonable determination that: 1) the disclosure does not violate the conditions or limitations under which the information was obtained; 2) the disclosure in identifiable form is necessary to the research purposes; 3) the research is of sufficient importance to justify whatever risk is involved; and 4) there are adequate safeguards to protect the record from unauthorized disclosure," the report said.

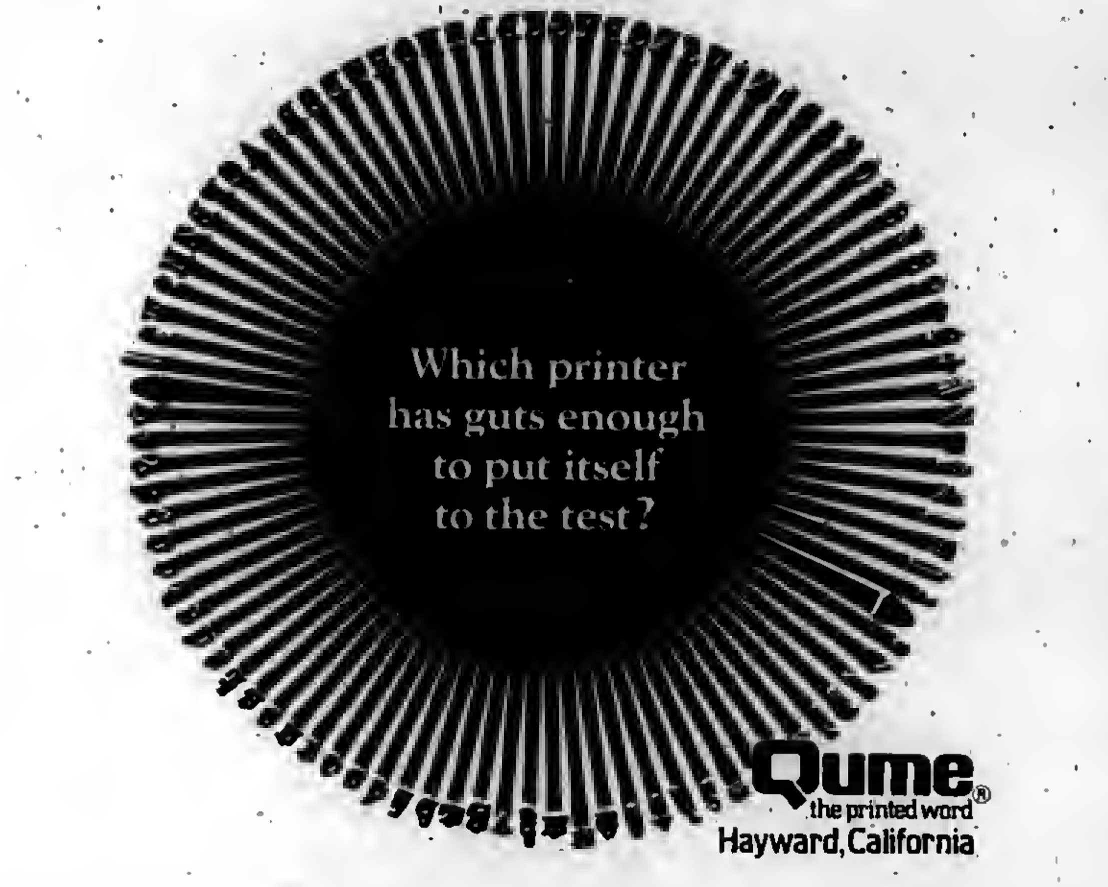
HEW suggested that its concern for the availability of identifiable health records for audit purposes stems from an awareness that "there is a serious problem of fraud and abuse in publicly funded medical programs."

Insurance Purposes

While HEW would sanction "permissive authority" to disclose health records for research purposes, the department believes authorization for disclosure to insurance companies is "overly broad."

Any authorization for disclosure of medical information to insurance companies and others like them must be dated and signed by the individual or someone authorized to sign for him, HEW said.

In addition, the nature of the information to be disclosed must be specified and the person or entity to whom the information is going should be spelled out.



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Auditors Lack DP Know-How

Federal Systems Auditing in Bad Shape: GAO

By Tim Scannell
CW Staff

WASHINGTON, D.C. — Internal auditing of computer-processing in the federal government is severely inadequate, according to a report published by the General Accounting Office (GAO).

Many internal auditors assigned to assure computer systems are operated efficiently, economically and reliably lack even a minimum of DP knowledge and training, the study found.

Data processing has become an essential and integral part of nearly every segment of governmnent activity with more than 10,000 computers at work and an annual budget in excess of $10 billion. For this reason, internal auditors should be capable of helping management ensure these immense resources are used and controlled effectively, the study said.

How's Your Auditing?

WASHINGTON, D.C. — Just how good is your DP auditing system? SRI International suggested at a recent conference here that users try to answer the following questions:

- Does your organization have a DP audit function? Does it function?
- Does top management have an accurate understanding of the level and timing of involvement of internal audit in DP?
- Does your DP audit organization have a management mandate? Is it observed?
- Does your organization have an adequate loss-reporting system?
- Does top management make periodic assessments of audit controls?
- Are control guidelines and standards in place in your organization?
- Are DP audit tools and techniques used?
- Is your DP audit training budget adequate for your needs?
- Are the three players — the user, DP audit and internal audit — working together or are they at loggerheads?
- Does top management really take an interest and provide support by taking the time to look at this area and understand it and by providing the necessary funding to get the auditing job done?

Computer auditing can be generalized into two broad categories, according to the GAO. The first is the auditing of a computer application.

If an auditor is assigned to review a computerizd payroll system, for example, his work will encompass such matters as the adequacy of various controls; controls over material input to the computer; controls over the integrity of the computer's processing; and controls over computer output, the report said.

The second type of DP auditing is much broader and goes beyond the computer itself. This type of work involves questions such as: Is the system properly designed? Is there a valid requirement for the system? Is the computer being operated efficiently? Is the computer configuration appropriate for the work to be performed?

Generally, independent public accountants who audit private corporations are concerned primarily with the first type of computer auditing because their work is often aimed toward verifying financial statements produced by the system, the GAO said.

Significant Benefits

The organizations where effective auditing is being done, results have been significant, the report pointed out. The Air Force Auditing Agency, for example, avoided having to spend $31.5 million after reviewing a proposed management information system.

Matters considered included the adequacy of objectives in relation to user needs, cost reliability and the validity of the technical requirements. The survey was conducted at 15 sites, several headquarter groups and with the system development group itself.

It was discovered that the original analysis of the problem was inaccurate and unsubstantiated. It was also learned that technical and equipment specifications were not proven and that users believed there was little need for a proposed on-line data base.

The audit resulted in a major change in the scope, equipment and personnel requirements for the system.

Another example is the Naval Audit Service, the GAO said. After conducting a routine review of a computer system installed at a Marine Corp facility, the service discovered that adequate standby equipment was not available in the event of a protracted power failure or troop deployment.

Surplus Found

A surplus of unnecessary equipment was also revealed in the course of the study. These findings prompted the right people to obtain funds to acquire the standby equipment and release unneeded items, the GAO pointed out.

Although these examples show the significance of good internal auditing, the report stated, no agency has yet achieved an adequate level of overall capability and coverage in DP auditing.

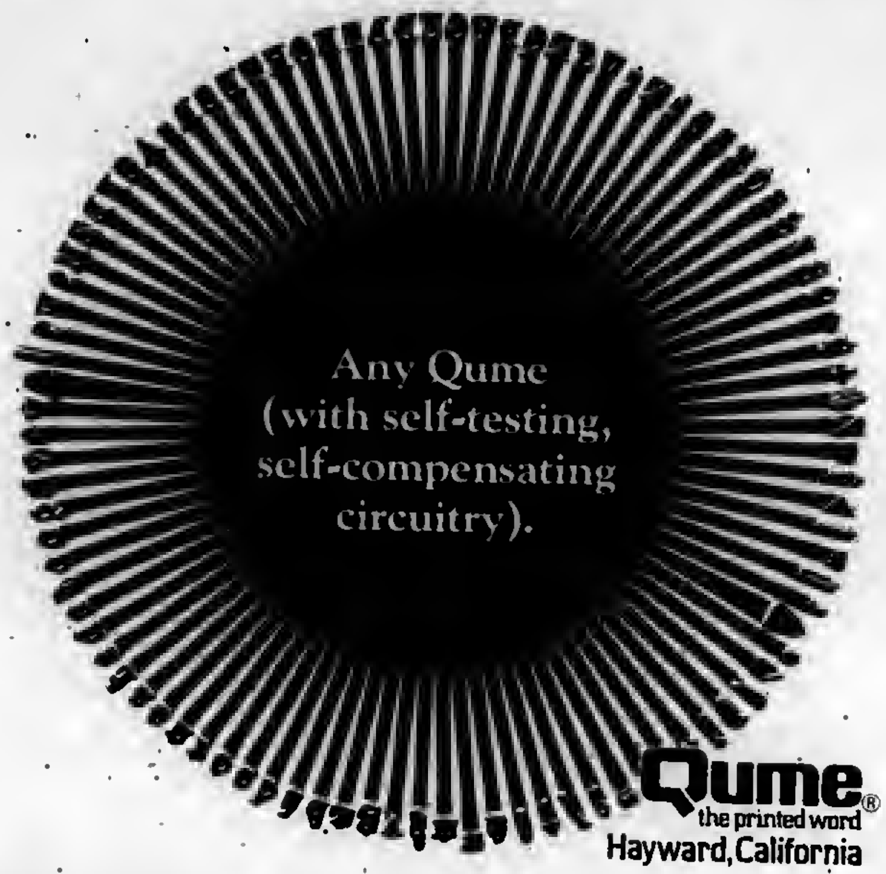
Within the Department of Defense — which had more than 4,420 computers as of June 30, 1976, and many wide-ranging automated data systems applications — the limited expertise and need for more training are pronounced, the study said.

234 Auditors Without DP

In a statement to the Senate Committee of Defense on Government Operations, the Deputy Assistant Secretary of Defense for Management Systems reported that out of a total audit staff of 2,264, only 234 auditors (about 10%) were considered to have extensive DP training and experience, the GAO report noted.

Over the years, standards have been developed for measuring the quality of audit work. The American Institute of Certified Public Accountants, the Institute of Internal Auditors and the U.S. Comptroller General suggest the following requirements for DP auditors:

- A basic understanding of computer systems, including equipment components and their capabilities.
- A basic understanding of computer operating systems and software.
- A familiarity with file-processing techniques and data structures.
- Sufficient knowledge of existing standardized audit packages.
- The ability to review and interpret system documentation including flowcharts and record definitions.
- A general familiarity with the dynamics involved in developing and modifying programs and systems.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Keeping Curricula Timely Seen Challenge to Colleges

By Esther Surden
CW Staff

SEATTLE — In a small college, keeping up with technology is the single most challenging aspect of providing students with marketable DP skills, participants in a conference panel agreed here recently.

Of the 56 students who graduated from the computer science program at the Oregon Institute of Technology (OIT), 53 have been placed in career-related positions despite the fact that the school is at least two years behind in teaching new hardware and software subjects, according to Frank Vaskelis, director of the college's computer center.

A successful program must have several elements, he noted. First, the school's administration must make a monetary commitment. Second, the college must encourage its staff to participate in a program of staff improvement and professional development. Third, programs offered should enable graduates to be employable, and these programs should be continually evaluated.

OIT uses several methods to find out what skills employers need and to make its graduates valuable to them. These include consulting an advisory committee from science, business and government, interviewing recruiting officers from various companies and surveying its recent graduates to find out how well-prepared they felt they were for their jobs.

Another method is a survey of businesses to directly ask management what the firms need in their DP employees. Such a survey recently resulted in a decision to offer a course on microcomputers, he recalled.

But other aspects of education can be important, too. At Angelo State College in Texas, communications skills are emphasized to prepare graduates for making oral presentations to employers and for communicating about projects, according to F.C. Homeyer, associate professor at the school.

Students meet rigorous requirements to produce term papers, article summaries, chapter reports, program progress reports and written documentation, he told the group.

Angelo State offers students two degree paths — a B.S. in computer science and a business administration degree. Students following both paths take the same courses for two years and then diverge. The business students are prepared for a career in commercial DP, while the computer science students go into more theoretical areas. Since the major was established in 1971, 40 students have graduated from the program, he added, noting that the students have usually been able to find jobs.

More significant than that, he indicated, is that "each employer of our graduates had returned to the campus to hire more" students.

Call for Papers

1978 POWER ELECTRONICS SPECIALISTS CONFERENCE, Syracuse, N.Y. June 13-15, 1978.

The conference will emphasize current and specialized component and systems technology in the areas of power, electronics and control. Topics, dealing with component/circuit interactions, include lower cost power devices for mass markets, power capacitors and magnetic components, weight minimization, forced commutation, HF induction heating and advanced terrestrial energy power processing transmission.

Five copies of a 300- to 500-word summary and two copies of a 35-word abstract should be sent by Dec. 5 to Program Chairman Yuen Yu, TRW Defense & Space Systems Group, One Space Park, Redondo Beach, Calif. 90278.

TENTH INTERNATIONAL QUANTUM ELECTRONICS CONFERENCE, Atlanta, Ga., May 29-June 1, 1978.

The conference will discuss new phenomena and materials, physics of basic devices, advances in theoretical understanding and new scientific applications in the field of quantum mechanics electronics. Papers are sought in such areas as excitation mechanisms leading to population inversion, laser chemistry and isotope separation, interaction of high intensity radiation with matter and low temperature quantum electronics.

Two copies of both a 35-word abstract and a 500-word summary with a set of figures suitable for journal publication (glossy photographs or original line drawings) should be sent by Jan. 2 to Optical Society of America, IQEC X, Suite 620, 2000 L St., N.W., Washington, D.C. 20036.

FIFTH INTERNATIONAL USERS CONFERENCE, Boston, Mass., May 5, 1978.

The Adabas user who gives the best formal presentation will receive a $500 reward. Informal presentations are also welcome.

If you are interested in making either a formal or informal presentation, contact Rob Macmillan, President of Adagroup at Simon Fraser University or Tom Berrisford at Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091, (703) 860-5050, before Jan. 15.

TRENDS AND APPLICATIONS 1978: DISTRIBUTED PROCESSING, Gaithersburg, Md., May 18, 1978.

Papers should describe practical experiences with distributed processing or those that present new research results. Topic areas include networks of processors, interprocess communication, security, performance evaluation and novel applications.

Three copies of a 1,000-word abstract should be sent by Jan. 15 to Dr. Ashok Agrawala, Program Chairperson, Department of Computer Science, University of Maryland, College Park, Md. 20742.

1978 MICROWAVE POWER TUBE CONFERENCE, Naval Postgraduate School, Monterey, Calif., May 1-3, 1978.

The objective will be to maintain lines of open discussion between tube manufacturers, systems manufacturers using tubes, and the Department of Defense. Papers are requested particularly in the area of ECM, radar, tube technology, millimeter waves and communications. They should describe either problems, new solutions or applications. To promote free expression of views, no proceedings are published, and photography or direct recording is not allowed.

Ten copies of an abstract appropriate to a 20-minute paper should be sent by Feb. 1, to Leonard H. Klein, Secretary, 1978 Microwave Power Tube Conference, Palisades Institute for Research Services, Inc., 9th Floor, 201 Varick St., New York, N.Y. 10014.

SIMULATION, MODELLING AND DECISION IN ENERGY SYSTEMS, Montreal, Canada, June 1-2, 1978.

Energy systems include electrical, oil and gas, nuclear, coal, solar hydrogen, wind, water and tidal systems. Topics include methodology, forecasting, environmental impact, selection, exploration, transportation, storage, financing and applications.

Three copies of a 200-250 word abstract should be submitted by Feb. 1, to Dr. M.E. Carver, Atomic Energy of Canada, Chalk River, Ontario, Canada K0J 1J0.

MINI— AND MICROCOMPUTERS AND THEIR APPLICATIONS — MIMI '78, Zurich, Switzerland, June 12-15, 1978.

All aspects of mini, micro, modular and meta computers and their applications will be covered, including hardware, software, technology, education, peripheral devices, personal and home computers and instrumentation.

Three copies of a 200- to 250- word abstract should be submitted by Feb. 1 to Secretariat MIMI '78, Interconvention, c/o Swissair Postfach, 8058 Zurich, Switzerland.

FIRST INTERNATIONAL SYMPOSIUM AND EXHIBITION ON COMPUTERS IN BANKING, Zurich, Switzerland, June 13-15, 1978.

Topics covered will include customer-activated terminals, point-of-sale applications, the automated branch, security, privacy, preauthorized payments, banking in developing countries and organization for regional banking.

Three copies of a 200- to 250- word abstract should be submitted by March 1 to Secretariat, Computers in Banking, Interconvention, c/o Swissair, Postfach, CH-8058 Zurich, Switzerland.

Calendar

Dec. 14-15, Milwaukee, Wis. — **Computer Graphics '77,** sponsored by Jerusalem Systems. Contact: Jerusalem Systems, Computer Graphics '77, 12201 W. Burleigh Road, Wauwatosa, Wis. 53222.

Jan. 8-11, San Diego, Calif. — **OCR Users Association Conference.** Contact: OCR Users Association, 10 Banta Place, Hackensack, N.J. 07601.

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DOCS is available from CFS, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

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Basic Steps Prescribed To Guide Planning Information Systems

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — Since no two users have exactly the same DP needs, no one can prescribe a universal set of guidelines for planning an information system.

On the other hand, by heeding a few general pointers, users can eliminate at least some of the pitfalls they might otherwise encounter in implementing or upgrading such a system, according to John V. Soden, a principal of McKinsey & Co. in New York City.

Soden outlined some of the most important of those pointers at a recent conference here.

First, he advised users to survey their existing information systems. In this procedure, they should first assess the strengths, weaknesses and opportunities of their current markets, technology and products, he said.

Then they should identify their company's most important business problem or goal and determine the firm's strategy for solving that problem or meeting that goal, he advised.

Next, users should set the managerial and technical policies that will govern how their prospective information systems will be organized, funded and allocated among their various departments, Soden said.

Finally, they should try to find out — by ethical means only — who their competitors are. One way of doing this is to interview the competitors' former employees, he suggested.

Conceptualize System

In the second planning step, users should conceptualize their intended information systems. This task should concentrate on ensuring that DP department plans dovetail with the goals of the company as a whole, Soden said.

Soden warned users, however, against letting the second planning phase become an end in itself.

Third, users should determine the potential value of their prospective information system to their various network members. The advice of an impartial and qualified third party should prove helpful in this regard, Soden explained.

In the fourth planning phase, users should define a plan to implement their target systems. In so doing, however, they must consider all alternative implementation schemes and make sure they present these options to management in a language it understands, he said.

Finally, companies that want to install an information system should try to gain as much internal support as possible for their implementation plans, he added.

Steering Committee Named For '78 NCC in Anaheim

MONTVALE, N.J. — A steering committee, headed by Stephen W. Miller of SRI International, has been selected for the 1978 National Computer Conference (NCC) to be held June 5-8 in Anaheim, Calif.

Members of the committee include Dr. Leonard Y. Liu of the IBM Research Laboratory; Dr. Sakti P. Ghosh, IBM Corp.; David Brandin, SRI International; Richard A. Marciano, SRI International; and others who will preside over the various sessions, exhibits, contests and special events.

The Personal Computing Festival, which will be presented concurrently with NCC, is also under the jurisdiction of the committee.

The '78 NCC is expected to draw a total attendance in excess of 30,000 with approximately 350 organizations participating in the exhibit program, according to a spokesman for the conference.

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Editorials

Paper Tiger

Honeywell Information Systems, Inc. claims its new Level 68/Distributed Processing System (68/DPS) is faster than the IBM 3033, but users better not be too fast in believing that claim since the firm refuses to support it with any hard technical data.

In fact, it appears the firm is offering only a "paper tiger" at this time.

Basically, HIS has reconfigured some of the units in its older Level 68 line of large-scale computers and lashed them together with old software.

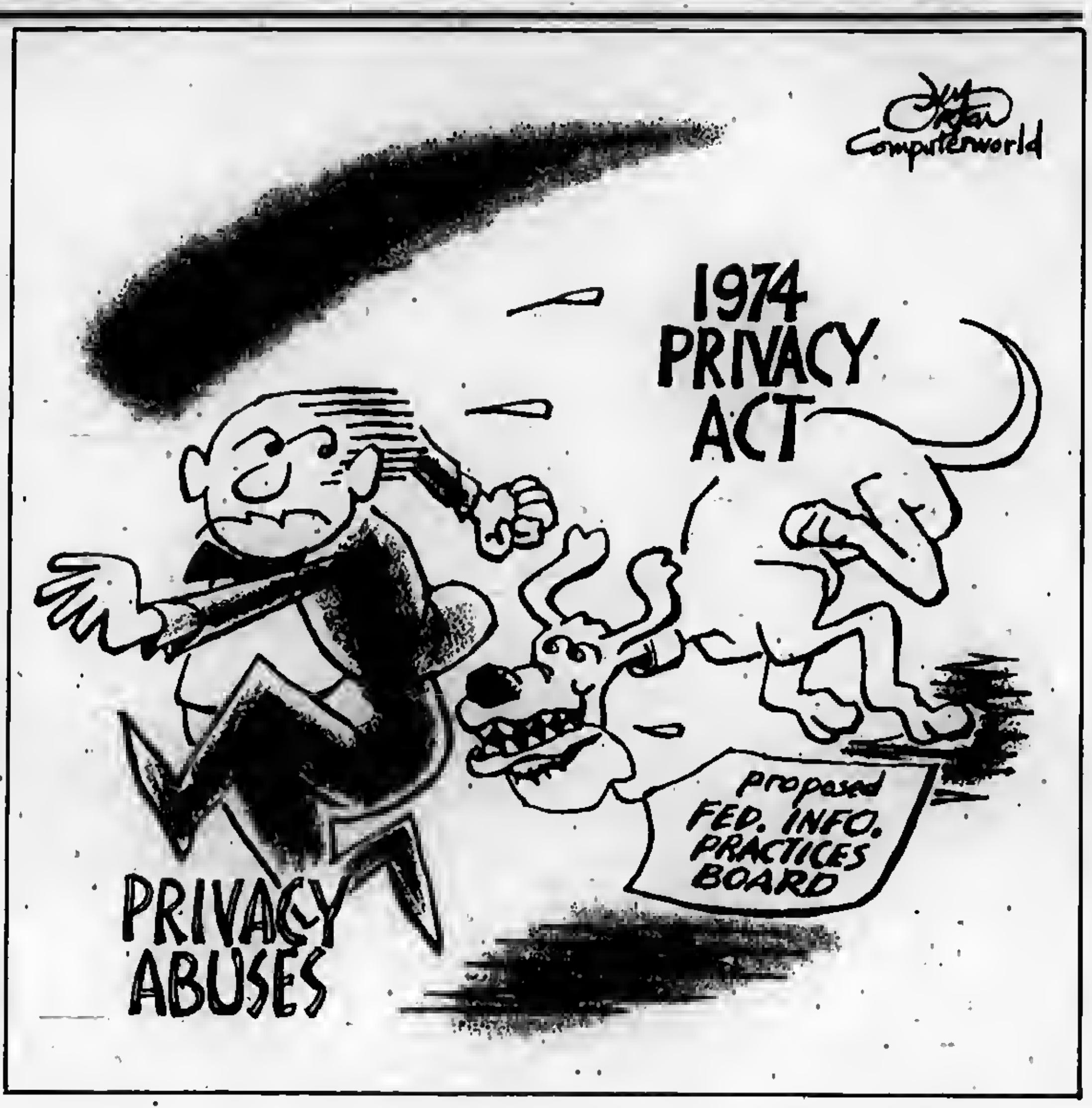
There is almost nothing new in its redesign of the system despite the claims made by the manufacturer — or at least there is nothing new that can be seen.

HIS soys the system ranges in power from 25% above the level of the IBM 3031 to 25% above the power of the 3033 at prices that are competitive. But if users are going to believe this, they have to do so strictly as an act of faith.

HIS apparently does not even know itself what the system will do. On announcement of the line of systems, it refused to give out cycle times, clock speeds, memory access times, throughput or benchmark data to support its extravagant claims.

Without such data, users are left completely in the dark about the systems' real capabilities.

With all of its recent fumbling in the large systems market, HIS is probably confused itself.



Matching Conflicts

The Department of Health, Education and Welfare (HEW) program that uses computers to match the names of welfare recipients with names on the government payroll [CW, Nov. 21] once again points out how conflicts can arise out of the use of information.

The program was designed to detect welfare fraud and therefore keep down welfare costs. At the same time, however, it raises serious questions about the privacy and confidentiality of records.

Eliminating welfare fraud is obviously a good idea. But so is privacy.

Furthermore, the program raises questions about the rights of the state vis-a-vis the rights of an individual. The state has a right to eliminate waste in its welfare programs, but the individual has a right to privacy of his records.

In this case the state is clearly willing to sacrifice the rights of the individual in order to make its operations more efficient and effective.

While no one can argue that welfare fraud should not be eliminated, individual rights should not be sacrificed to that goal.

When a person gives a governmental body information for one purpose, it should not be used for other purposes. Once the door is open for matching such records — even in a good cause like detecting welfare cheats — it will be easier and easier for the government to match records for less worthwhile purposes.

Data Past

Five Years Ago
Nov. 29, 1972

WASHINGTON, D.C. — The Supreme Court, in a unanimous decision, ruled that some computer software is not patentable. The court held that some programs are essentially ideas and that "it is conceded that one may not patent an idea" as would have been the case if the patent in question (Benson-Tabot) had been allowed to stand.

DENVER — The Colorado Supreme Court barred the compilation of arrest records on persons never convicted of crimes. The move made it illegal for police agencies to store or transmit criminal history information or rap sheets on persons arrested for criminal acts but never convicted.

Eight Years Ago
Dec. 3, 1969

MIDLAND, Mich. — More than 1,000 tapes at a Dow Chemical Co. computer center were erased in a protest against the Vietnam War. Damage estimates ranged up to $100,000.

A group called Beaver 55 took credit for the damage. A Beaver spokesman said the tapes were used to store data from "research into such areas as nerve gases, napalm, defoliants and other secret chemical weaponry." A Dow spokesman denied the charge.

— — —

WASHINGTON, D.C. — Social Security Administrator Rohert M. Ball said computer programming for an increase in Social Security benefits could not be handled quickly as a practical possibility. Ball explained that converting to a higher level of payments was not a matter of making a simple percentage increase in each present payment.

Ball was replying to a question raised by Rep. James A. Burke of Massachusetts before the House Ways and Means Committee concerning the length of time it would take to provide the proposed raise in Social Security payments.

Letters to the Editor

Get Ready for Rewrite

Philip Kraft, author of *Progrommers and Monogers* [CW, Nov. 14], obviously never had to debug or modify someone else's program, nor did he bother to interview the unlucky programmer assigned to a program maintenance group whose sole purpose in life is to determine what a creative genius meant by — ADD DICK TO JANE, JUMP TO JACK.

Kraft also has never tried to follow the unstructured, unrelated, 300 or more rambling sentences of some paranoid, schizophrenic "genius" whose only reason for not being institutionalized is because he bears the title of "programmer."

This could go on and on, but I suggest Kraft pursue either one of the above and then get ready for a rewrite of *Programmers ond Managers*.

David L. Green
Dayton, Ohio

No Solace From Webster

The feature that inferred me to be among those whom Philip Kraft labled as "marginal people" drove me, seeking solace, to my Webster's *Seventh New Collegiote* Dictionory.

This further depreciated my fast-ebbing self-esteem as I imbibed of the following definition for "marginal": "3: located at the fringe of consciousness" and "4a: close to the lower limit of qualification or acceptability" . . . moan!

Definition 2b(2) seemed to offer the only hope.

On another article in the same issue, "Training Program for Inmates 10 Years Old," in the accompanying photographs they all looked older.

Peter Kushkowski
Haddam, Conn.

Could Univac Really Deliver?

I personally cannot let go unchallenged the article "County Revokes OK of Sole-Source IBM Order" [CW, Nov. 14]. It is obvious it was written entirely from information supplied by Univac representatives.

The article contains misinformation and misleading insinuations. It infers that Univac is the White Knight to the rescue and that DP Director John Veon's staff is a bunch of incompetents.

I assure you this is not true. Originally we explored every viable alternative solution to our computer needs and arrived at the conclusion that with our particular set of circumstances, IBM 370/158 equipment and software offered the best present solution, with necessary reserve capacity and upward expansion capabilities.

One among many considerations was that while the 95% conversion factor cited by most manufacturers may seem favorable, when applied to our approximately 1,000 application programs and necessary time restriction, it becomes intolerable.

Because of space restrictions, we cannot run parallel equipment. Old equipment must be moved out and the new moved in and running within a three-day weekend.

I also question whether the Univac 90/80 has completely the same capabilities and upward expansion as the IBM 370/158. However, we could probably afford the great deal of extra conversion time and expense if Univac could truly deliver equipment comparable to an IBM 370/158 for $1.7 million less than IBM's quote of $2.1 million.

Sidney J. Ketchum
Assistant Systems and
Programming Supervisor
Data Processing Department
Kern County
Bakersfield, Calif.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Ethics Council: Bright Idea for Dark Ages

The Human Connection

By Jack Stone
Special to CW

In a recent column, Alan Taylor provided some significant new information on the DP ethics issue [CW, Oct. 31].

First, he noted that audiences at three rather formidable conferences — SRI International workshop, the National Computer Conference and the Data Processing Management Association Conference — "split" on the question of program ownership which asks whether a programmer has rights to a program "tool" that he develops on his own, using company resources, to do a better job.

Then he discussed a rather intriguing suggestion for an Ethical Standards Council. The idea here is to collect "25 to 50 representatives who would vote anonymously on selected [ethical] questions," either as a body or as groups of seven to nine members, and "then have their voting records published."

As I have strong views on the matter, I decided to enter the controversy via critical commentary in my next column. But because the hour was late or because the Redskins played miserably against the Giants or because I was benumbed by the electrifying discussions of DP ethics in the trade press, I chose to catch 40 winks before starting to write ...

... The visitor was more than apprehensive as he trudged across the drawbridge. The heavy, oaken door of the castle was opened by a figure dressed in a long white robe and a tall, white, pointed hood.

He was quickly ushered into the Great Hall, which was lit by flaming torches hanging from the ceiling. The Ethics Council members sat in high-backed chairs on a platform against the far wall, perhaps 25 to 50 of the robed, masked figures, huddled loosely in groups of seven to nine. He was directed to sit on a small three-legged stool in front of the Council.

One of the members rose, stepped forward, unfurled the accusatory and decried, "Adam Begonah, data processing manager! You have been accused of immoral, unethical, and ignoble conduct in your computer center.

"You are charged with denying your DP employees their divine rights to produce their own software on company time by terminating their use of the firm's computer for their own product development and restricting their access to the Wats line for marketing their products. What say you?"

Begonah stood and with a strong voice replied, "Mr. Chairman, although I performed the actions you described, I am innocent of wrongdoing. I was only following the ethical standard used by all the other technical professions in America that states a salaried professional employee cannot engage in any outside activity related to his profession for his own personal gain and all products, inventions, methods, etc. developed by him — on or off the premises — are the property of the employer."

"Heresy!" screeched the chairman.

"Heresy!" echoed the Council members.

The chairman began the inquisition: "Don't you understand that DPers are not part of the humdrum mainstream of U.S. technologists, but a superlative breed apart and merit the heaven-sent privilege of pursuing outside interests using company resources?"

Begonah's voice did not waver. "The standard is based on the proper notion that any outside activity represents a potential conflict of interest in which business opportunities could be siphoned away from the firm and channeled into the employee's pocketbook. If the employee wants the extra DP income, he should form his own company and face the same business risks as his current employer."

"Blasphemy!" boomed the chairman.

"Blasphemy!" echoed the Council members.

The questioning continued. "But can't you see that when a programmer takes the initiative to develop a 'tool' which helps him to be more efficient, he is actually helping the company and, assuming the development was not specified by the company, his unsolicited efforts merit his full ownership rights to the 'tool'?"

"No. The standard still applies. The company owns the tool. The salary is intended to compensate for these ideas. The true professional is expected to develop tools, systems, procedures and methods that will enable him to do a better job, all of which are rightfully owned by the employer. Further, if the tool is deemed to have particular value, the employee is ethically bound to notify the company of its existence."

"Notify the company?" the chairman shouted.

"To the stake! On to the stake!" roared the Council members ...

I woke up in a cold sweat and quickly decided to switch the subject of my next column to a strictly noncontroversial topic.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

DPers May Soon Face Era of Malpractice

The Taylor Report

By
Alan
Taylor
CDP

The prototype of the professional DPer's responsibility — and the extent of it — was shown last week to be analogous to that of an architect, rather than that of a doctor. In the New York trial of F. & M. Schaefer Brewing Corp. vs. Electronic Data Systems Corp., Federal Judge Constance B. Motley made this distinction. This is important, because the profession has long been grasping for the privileges of doctors and auditors as being the hallmarks of professionalism.

Doctors' privileges arose from the nature and maturity of their profession and auditors' privileges arose from society's need for independent second opinions on accounting matters.

Architects, however, have none of the doctor's privileges and few of the characteristics of auditors, but they have a special relationship with those outside their profession, a relationship that puts them on notice that they must perform their architectural duties correctly — or else.

In deciding that the complexities of the DP operation and language can plausibly constitute a similar special relationship, Judge Motley also indicated that such responsibility might well last for many years after the actual "malpractice" took place.

Years of Responsibility

This is because of a doctrine called "continuous treatment," which in the case of accountants seems to mean that a client isn't expected to constantly call for second opinions from other accountants; the same holds true for architects — at least as long as a single job is going on.

Thus, if a mistake is made at the beginning of a contract, but is not discovered until well after its completion (the contract may itself last three or four years) the Statute of Limitations doesn't bar the victim from being able to get some relief for the faulty building, or whatever.

All of this adds up to a revolution in DP responsibility and apparently in DP practice — or malpractice, perhaps. It's rather like the time when the germ theory of medicine became officially accepted and anyone found not sterilizing the scalpels became liable to be kicked out of the profession. The whole previous power of the witch-doctor to blame failures on incorrect incantations — or upon the fact that the luckless lover kicked a black cat on the way to deliver the fatal love potion — went out the window when germs became understood.

In the case of the architect, if a girder is the wrong type to carry the load, then the fact that it is shown in a diagram of the building which has been signed off by the client makes no difference to the cause of the building failure. It is the architect's special relationship with his lay client that makes him responsible for the incorrect beams, and it is now our professions' responsibility to find something that affords the public the same type of professional protection that strain analysis methods and sterilization techniques give the clients of architects and doctors.

Just what this protection will be we don't know. And because of the method of justice practiced here in the oldest, most densely populated automated country in the world, it is unlikely that we will find out *beforehand*. Cases are still being heard that involve the events of 1968 and 1969 and a similar lag can be expected to continue.

The only way we could know ahead what is regarded as being sufficient would be through Congress' passing some sort of law which sets us up with legal monopoly and duties — a licensing technique, perhaps. As readers of *Computerworld* well know, that is something the profession will fight to avoid.

This is not a very satisfactory method. It might well frighten those who would offer computer malpractice insurance (who can no longer rely on contract provisions always being able to limit the damage to a trivial amount). Still, with the profession as powerful as it is, and as young as it is, it seems inevitable that this situation will continue for some time yet.

Probably the first system-design malpractice insurance will have to come from technically strong groups who will hopefully be able to cut through the technical and legal forests and so be able to somewhat reduce the presently astronomical litigation costs. (If anyone has any suggestions or knowledge as to where this is being considered or being performed, please write to me so that we can all know.)

International Idea?

The beauty of the Motley analogy is that is seems right. The relationship between the legal duties and client relationships of architects and system designers is so easily understood by outsiders that I feel that it will catch on.

It is not original in itself, of course. But this is the first time that I know of where it has been the basis for a legal decision, in this case that the relationship permits the continuing treatment doctrine to apply.

The days of the "witch doctor" analyst are not yet over, I am afraid, but they are numbered. The future may not be so romantic but it will protect those who work properly and throw out those who don't. And that is a very great advance.

(Please note that there is no copyright on this article, nor will there be on any future articles that deal with this subject. Please reprint and distribute them freely. Disagree if you wish, but don't ignore the fact that things have changed with the recognition of professional responsibilities that now exists.)

Software Builder's Dilemma: Spec Changes

By Miles Benson
Special to CW

Sociology of Computing

It's not often software technologies have to keep a "Pearl Harbor File." But the one Marty Whipple kept may've been the smartest political move of his career.

Not only that, but it became a significant factor in his management's understanding of the Software Builder's Dilemma, circa the 1970s.

To get this story under way, let me define a term or two. A "Pearl Harbor File" is a historical record of a series of interrelated events, created hecause the author believes he may need it for self-defense someday.

"Marty Whipple" is the pseudonym for a systems analyst at the mythical firm of Second Growth Lumber Co., down in the hypothetical community of Drawl, Ala. (across the state line from the somewhat less hypothetical town of Plains, Ga.).

And the Software Builder's Dilemma is the complaint, spoken more loudly and in more anguished tones as the years go by, that software is too expensive, too complex and too unschedulable, while at the same time its users impose more and more tricky requirements on it.

Getting Down to Specifics

But let's get down to cases.

Marty Whipple smelled a rodent from the very beginning of the Second Growth Measurements in the Field Research Project. Conceptually, measuring tree growth in real time to determine the impact of various growth factors was a nifty task. Some of the problems pushed the state of the art a little, but in challenging rather than threatening ways.

It was the people Marty was dealing with that caused his panic button to twitch nervously. Frank Crenshaw knew tree farming ahout as well as anybody in the country, but inside Second Growth he had a reputation for pinching pennies and blaming others for his mistakes.

And Earnest Cottonwood was a sharp manager, but driven by an ambition so aggressive that some people said that he burned his bridges before he crossed them.

Marty could see the handwriting on the stump from the beginning of the project, and early on he labeled a file "historic background" and kept it up to date with every new policy decision.

In fact, this story might best be told by just lifting some excerpts from Marty's file. Fortunately, he wrote it like a diary, so it reads fairly well. And who can resist the temptation to read someone else's diary?

"*Feb. 20:* Crenshaw and Cottonwood have a terrific idea — a set of experimental tree growth plots, each with its own computer in the field, measuring various growth factors to scientifically determine their impact.

"The payoff is that the company stands to improve its tree farming techniques. The problem is that it doesn't know beans about computers. I'm assigned to educate everyone.

"*Feb. 27:* The more I look, the better I like it. There are too many old wives' tales in our field. Crenshaw and Cottonwood want to get some scientific data to prove or disprove them. And a computer appears to be the hub of the job.

"I only wish C and C understood some of the implications of what they're doing from a software point of view.

March 12: "C ond C: opted for the 'Keep It Simple, Stupid' Approach - but only for the hardware. This job needs at least a 32K Quadranova mini with ruggedized components to fight off the environmental elements.

"C and C are only willing to buy a 4K Marketronics box with commercial components because they're planning on ten widely scattered test plots and they want to hold the costs down.

"Besides, the Marketronics rep told them it'd do the job. I see trouble ahead.

"*April 4:* Top corporate brass gave C and C the go-ahead for the project. Unfortunately, they only requested funding for the Marketronics computer. Now the software fat's in the fire.

"*Moy 16:* This joh is about three times as hard as it should be. The software has to be folded into the machine in overlays because of the small core.

"But the overlay mechanism is expensive, and all of a sudden I'm not sure that the Marketronics is fast enough to do its real-time chores and keep up with overlay management. Sizing problems beget timing problems.

"*June 4:* Had to scrap all hope of using a high-level language today. C and C don't like it. I convinced them earlier that it would lead to a more maintainable code, but high-level code was running 37% less efficient than Assembler, and I haven't got 37% to throw away.

"*July 23:* I was about three-fourths through coding when C and C changed the experiment design. Fortunately, I coded in a pretty modular way, but still there's major Impact on my software design. This project is getting to be less fun every day.

"*Aug. 1:* Crenshaw told me today I was well over budget on software implementation. He is also beginning to see at least a six-month slide in the schedule for first data acquisition, and he says it's my fault.

"It wasn't the time to hit me with that. I was still redesigning from his experiment change, and my temper was already as taut as a choke collar on a frisky puppy.

"I told him where he could stick his instrumentation. Fortunately, we ironed it out. No, smoothed it over would be more accurate.

"*Sept. 16:* The program can run some test data, but it's sure a kluge. Maintainability is shot, both because of the changes and because only really tricky coding would get the job in core. Now for the field tests.

"*Oct. 1:* The field tests failed miserably. I know it's the commercial hardware — the Marketronics just isn't rugged enough to withstand dew and 40 temperatures — but C and C blame me.

"It couldn't be the hardware, they say — not with 4,000 others in the field and working successfully. (Bet thot argument came straight from the marketing rep.) Voila — it must be the software.

"I'm spending more time on self-defense than I am on working the problem.

"*Oct. 8:* Finally proved my point. Ran the field tests in the lab and they worked. Crenshaw tried to hush my findings, but I was too mad to be muzzled. Top brass is going to hear about this.

"*Oct. 12.:* Top brass didn't care. 'Hardware, software, it's all the same,' they said. 'We don't care who's at fault, just get the job done. Or we scrap the project.'

"*Nov. 28:* : Worked Thanksgiving weekend to finish field checkout. C and C's idea of a protectective structure around the Marketronics for environmental control worked, but it cost a fortune. The Quadranova would've been cheaper.

"But anyway, we're on the air. Over budget, behind schedule and with a shabby product.

"*Dec. 15:* C and C did it, just like I knew they would all along. 'The software was at fault,' they told the brass. 'Otherwise, we'd have been on the air long ago.' Time to fire my guns, I guess.

"*Jon. 4:* The series of meetings with management was worthwhile. For the first time, I think they're beginning to understand software.

"Sure, I was over budget and off schedule. Good old flexible software, let it solve all the problems no one else can solve..

(Continued on Poge 18)

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Reader Commentary

Freed to Sherin:
Know the Rules of Law or Get a Lawyer . . .

By Roy N. Freed
Special to CW

Morgan Huff of Nashville wrote a plaintive letter [CW, Nov. 7] about how Bob Sherin got short shrift from a federal court recently. Sherin challenged as unconstitutional the recent action of the Tennessee legislature in subjecting software transactions to its sales tax after its Supreme Court wisely ruled they were not covered by the then-current scope of the law that taxed transfers of tangible personal property.

Huff and Sherin deserve our sympathy, not because they are offended by the federal court's failure to find the Tennessee legislature's action illegal, but rather because they were willing to try to understand the entirely reasonable rule of law that applies to the case.

There is no substitute for knowing what the law is. It saves lots of wasted energy, emotional unhappiness and the court's valuable time.

Shering had a piece in *Computerworld* characterizing the Tennessee legislation as unconstitutional. I presumed to respond in *Computerworld* that it might be stupid, but it wasn't unconstitutional.

It is a fundamental principle that, in the exercise of the very broad police power, legislatures properly may take a wide variety of actions, including imposing all sorts of taxes.

Despite gratuitous and gratis legal advice, Sherin plunged ahead, acting on his own behalf. I doubt he could have found many lawyers who would see any merit in the caso; the results that troubled Morgan Huff were a foregone conclusion.

The Lesson Learned

What is the lesson from this incident? There is a large body of legal rules that have been developed over the years for our system of government and our society. They apply to people in the computer industry as well as to those in other activities.

There is no substitute for knowing the rules of law in conducting business activities, which includes structuring transactions, creating agreement forms, conducting negotiations, identifying tax liabilities, selecting measures for protecting proprietary software programs and assessing and treating tort liability exposures.

If you ignore the rules of law in operating your own business, you subject yourself to financial harm. If you do so in conducting someone else's business, your are unprofessional at the least and possibly even irresponsible.

The apparent mystique of computer technology seems to have

(Continued on Page 22)

. . . Lawyers, Laymen Can Join Forces

By Rober M. Sherin
Special to CW

Roy Freed's analysis of my case in federal court against a Tennessee statute taxing software (Sherin vs. Tennessee) echoes the position of the defendant Tennessee.

His numerous characterizations of Morgan Huff and me create an aura — at least to me — that lawyers have a monopoly on wisdom. While Freed's opinion on the case, consistent with Tennessee's, does not merit our close consideration, his characterizations do not.

In the case two issues have arisen. The first is whether the due process and equal protection clauses of the Fourteenth Amendment bar the Tennessee legislature from classifying software as tangible in the face of the earlier Tennessee Supreme Court decision finding software intangible.

The second question is whether the Tennessee remedy of payment of the tax and a suit for a refund is a "plain, speedy and efficient" remedy within the meaning of the federal law; if it is, the federal court will refrain from taking jurisdiction.

On Nov. 15, after a hearing was held on both issues and following the filing of some 300 pages supporting the plaintiff's case, the court handed down an order and a three-page memorandum. Chief Judge L. Clure Morton ruled the Tennessee remedy is adequate and therefore "the court cannot grant [plaintiff] the relief he seeks."

Since there is an overwhelming body of recent case law to the contrary, the plaintiff is appealing the decision to the Sixth U.S. Circuit Court of Appeals in Cincinnati and is optimistic about the outcome.

Law Not Clean

"The entirely reasonable rule of law that applies to this case" expressed by Freed is clear neither to laymen nor lawyers. When the judge said in open court that a state legislature can call black white, men women and intangible software tangible, Morgan Huff wasn't the only one astounded.

Although that statement on its face may sound irrational, in the world of jurisprudence the self-evident often assumes epic, mind-searching proportions. After intensive reflection, I believe the judge meant it is of no constitutional significance to the federal court that the legislature may have usurped the Supreme Court's authority, and the burden remains on the plaintiff to prove the alleged usurpation is a violation of the Fourteenth Amendment.

Most laymen understand due process takes time. It is not uncommon for court cases to consume years.

In my efforts against unlawful software taxation before legislative courts representing the Data Processing Management Association (DPMA) and before judicial courts representing myself, I have tried to formulate the issues so as to avoid protracted litigation.

Our Florida victory (6 Computer Law Svc. Reporter 18) took five months. DPMA's participation in the recent New York victory took seven months.

Just as we laymen understand the time it takes lawyers to reach the ends of justice, Freed should be equally tolerant of us laymen.

The need for lawyers and laymen to work together as equals is best exemplified by the industry's recent victory in New York. For over a year lawyers and laymen had expressed differing views concerning the best remedy.

After laymen in DPMA set up the administrative remedy that resulted in the ultimate victory, all of the parties buried their differences and got the case together. The rosult was colossal and conclusive.

By now it should be apparent that the much feared "retroactive tax scare" is a mirage from which the industry should not cower and abandon the prospective fight. Ultimate victory everywhere requires zealous opposition to both unlawful retroactive and prospective taxation and, time is of the essence.

The forum chosen for the challenge should be as close to the revenue agency as possible, depending on the nature of the adverse ruling. Winning this cause against unlawful taxation demands the best for the industry from lawyers and laymen alike.

Sherin is president of Nova Computing Services, Inc., a Miami service bureau. He also serves as a legislative adviser to DPMA.

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Users' Report...

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Convair Manager Feb. 1977

The authors cover government requirements in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its effectiveness in competing for contracts. Excellent guidelines are given on how to analyze and respond to RFP's, RFQ's and IFB's. Simplified formulas enable accurate costing-out of engineering, R&D, service, manufacturing and production projects.

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Reader Commentary

Inexperience Causes 'Adolescent' Managers

By Ben H. Carter
Special to CW

It's always interesting to read an article about the failings of DP managers like "DP Managers Still in Adolescence: Withington" [CW, Oct. 17].

I don't know the extent of Frederic G. Withington's direct management experience in DP operations, but many consultants in the DP area have very little real background in the field in terms of actually developing a management information system (MIS) within the corporate environment.

My experience includes 25 years in systems and DP, both as an internal manager of these functions and as a management consultant to various industry clients. As the result of analyzing company information requirements and their DP operations from various viewpoints, I have come to certain conclusions regarding the communications problems which exist between the DP function and corporate management.

Basically, too many DP managers have been moved into their position from a technical background without having the opportunity to gain management experience or without having management ability. This situation produces some of the attitudes and conditions Withington described and is, to a great degree, the fault of management in general.

A high percentage of specifications for DP management job openings include requirements for specific programming background, knowledge of a particular piece of hardware and other technical expertise.

Little, if any, consideration is given to overall management ability.

Measure of Effectiveness

Actually, a DP manager's effectiveness is determined by his ability to plan and manage his staff and its projects, interact well with all other functional areas of the company and involve himself with overall corporate planning so the future MIS is properly developed and integrated.

DP managers with technical orientations tend to be weak in communications with those in other departments who are not well versed in specific programming and hardware functions. The technician (in his frustration) designs systems to suit his idea of what data should be processed and what outputs are necessary, with very little conceptual definition and discussion with users in the design stage.

Also, he does not delegate projects to his staff to the desirable extent, but does most of the work himself, to the exclusion of other DP management requirements.

The second major problem area is the relatively low capability of the average corporate management member to do an effective job within the environment existing in many companies: Politics, lack of management training, provincialism and other basic organizational problems that thrive within middle and top executive levels create serious difficulties in MIS implementation.

In addition, the DP division quite often reports to a second-level department, such as accounting or office services, thus limiting the overall access to major corporate activity areas which require attention.

Frustrated Technician

Couple these two conditions together and you find highly qualified DP technicians, frustrated by management inaction and indecision, criticizing users, creating conflicts between DP and the organization and often appearing to be "know-it-alls, simplistic, self-centered, too ambitious, incommunicative and arrogant," as Withington described it.

Another factor is the nature of the average DP person. He is normally an individual who has a logical, direct approach to problem solving, plans and documents well, is above average in general intelligence and dislikes company politics and sloppy management techniques.

Again, the resulting conflict is natural when he is forced to interact with the illogical and poor planning so prevalent in the business world.

Basic Capabilities

Basically, I think that a DP manager must have the following capabilities:

- A good systems and/or programming background and sufficient understanding of what the DP function can and should contribute to the corporate operation.
- Heavy exposure to a variety of functional areas and people; ability to deal with diverse situations.
- A solid approach to planning and executing projects.
- Sufficient strength of character to insist on a well planned appraoch to DP utilization which provides direct communication with top executive levels in systems development situations.
- Ability to select and direct highly qualified staff members in systems programming and operations.

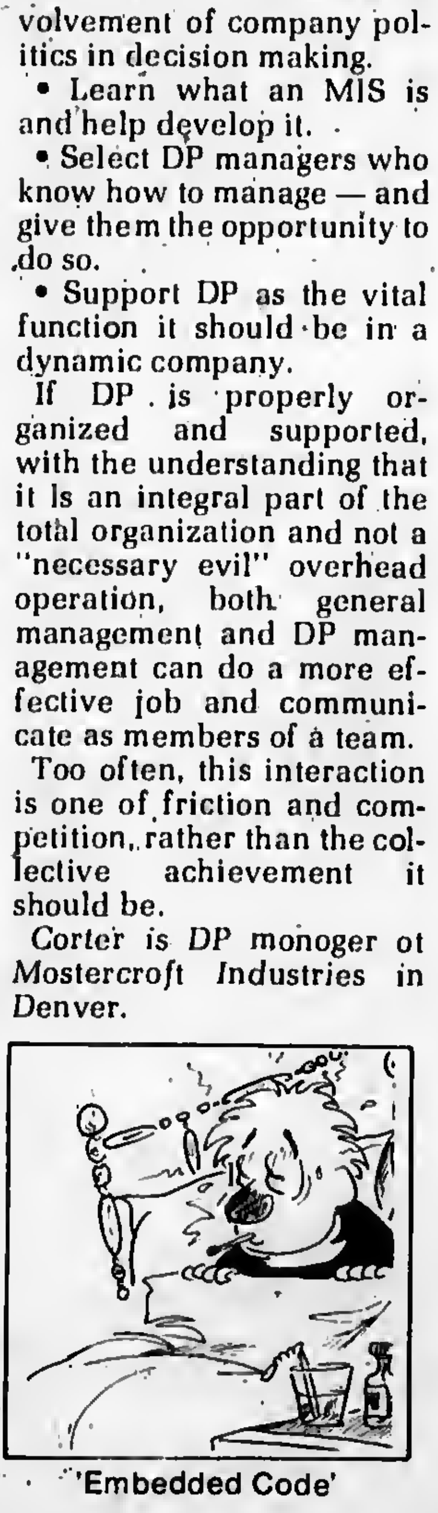
Business managers, especially in smaller companies need to:

- Improve their basic management and planning methods and reduce the involvement of company politics in decision making.
- Learn what an MIS is and help develop it.
- Select DP managers who know how to manage — and give them the opportunity to do so.
- Support DP as the vital function it should be in a dynamic company.

If DP is properly organized and supported, with the understanding that it is an integral part of the total organization and not a "necessary evil" overhead operation, both general management and DP management can do a more effective job and communicate as members of a team.

Too often, this interaction is one of friction and competition, rather than the collective achievement it should be.

Carter is DP manager at Mastercraft Industries in Denver.



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Changing Requirements Software Builders' Snag

(Continued from Page 16)

"Well, I think this case history helped clarify a few things. At least, I hope so.

"*Feb. 20:* I knew it, I knew it. One year to the day from project start, the software bailing wired together, C and C want to introduce two new parameters and a pair of new reports.

"I'll do it, of course. But it's going to be hard. And Slow. And painful."

When I stop to think about it, Marty's story isn't all that new. Requirements changes have been a plague on the house of software for at least a decade or two.

But maybe, just maybe, Marty's Pearl Harbor File may have opened the door to management's understanding why that new change is going to take as long and cost as much as it will.

Because if they don't, the Software Builder's Dilemma can only get worse.

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- Reduces the complexity and cost of field maintenance (all work is done from the front).

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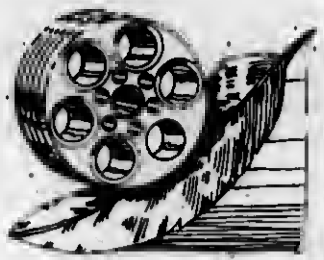

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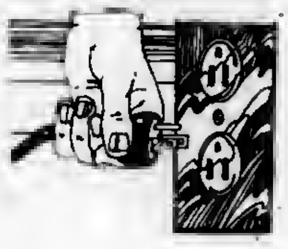

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Letters to the Editor

Not Necessarily So

Lee R. Prescott's letter ["Dispersing Incompetence," CW, Nov. 21] compels me to comment on the Nov. 7 issue's coverage of my remarks at the Munich Systems 77 conference ["Lecht: Dispersing DP Means Distributing Incompetence"]. I did, in fact, make the point that distributed data processing can result in dispersed incompetence [as opposed to the contained incompetence that may characterize a centralized EDP site). However, I do not believe this is a necessary consequence of employing distributed systems. Indeed, that DDP can be beneficial is inarguable, in my view.

Prescott's letter assumes IBM's distribution scenario; this is borne out by his references to "the central staff of designers and programmers" and "the large central host complex." This language does not imply recognition of the new, now commonly accepted notion of *distribution of systems control* espoused by most of the other manufacturers: rather, it suggests that DDP merely involves a better distribution of today's systems hardware resources.

The Norris (Control Data Corp.) notion of DDP, which involves the possibility of distribution of control of the network from one site to another, with all that implies, more fully describes the DDP concept.

The Systems 77 coverage indicated that I think IBM is, in some way, resisting DDP. I do not believe I said this. What I did say is that IBM's posture with respect to continued single processor centralization of network control suggests that its concept of DDP is less flexible than that being entertained by most of the other manufacturers.

Prescott's description of DDP (which coincides with IBM's), subsumes a hierarchically organized network containing a single, controlling "mother" processor. We wonder if a major motivation for this DDP scenario may be found in recent industry conclusion that, even if all the software and hardware necessary to manage DDP according to its widest definition were available, increasing shortages of technically skilled personnel would make it less attractive to attempt. Or is it motivated by the lack of a clearly defined IBM product?

In any event, I never predicted an early demise of DDP as such. What I did say is that the "imperial" deployment of DP envisioned by IBM and the "proletarian" deployment seen by CDC were restatements of an old argument between centralization and decentralization — an argument without simple resolution.

Charles P. Lecht
New York, N.Y.

Cobol Verb Suggested

I would like to suggest that a new Cobol verb be established to be used for setting a level 88 condition name. For example:

```
05 MARITAL-STATUS-FLAG PICTURE 99.
   88 STATUS-IS-MARRIED   VALUE 0.
   88 STATUS-IS-SINGLE    VALUE 1.
   etc.
```

Current procedure allows the flag to be checked with a straightforward "IF STATUS-IS-MARRIED ...," but requires "MOVE 0 TO MARITAL-STATUS-FLAG" to specify the condition.

The only way to determine what a 0 in this field means is to refer to the field definition in the Data Division. If a new verb, "SPECIFY," for example, were established, the "MOVE ..." statement could be written "SPECIFY STATUS-IS-MARRIED." This seems to me to be much more meaningful and certainly more in keeping with the "readability" of Cobol.

In order to accommodate multiple values for a condition name, a "WITH" clause could be used to indicate the specific value. For example:

```
05 MARITAL-STATUS-FLAG  PICTURE 99.
   88 STATUS-IS-MARRIED  VALUE 0 THRU 9.
   .
   .
   SPECIFY STATUS-IS-MARRIED WITH 7.
```

Ket Watters
San Francisco, Calif.

Major Inhibiting Factors

In reference to the article "DP Can Aid Society and Vice Versa" [CW, Oct. 24], I am very definite in my conclusion that the current state of the art in computers is inhibiting the proper, acceptable and widespread use of computers. This obstacle mainly concerns the engineering and hardware technology of computers and systems. I cannot imagine revolutionary and advantageous widespread uses of computers in the world market without breakthroughs in engineering and software technology.

Subhash C. Bakshi
Branch Hill, Ohio

Lawyers Can Join Laymen

(Continued from Page 17)

dazzled or distracted many participants in the industry in many ways. One way has been to deter them from seeking sound legal advice.

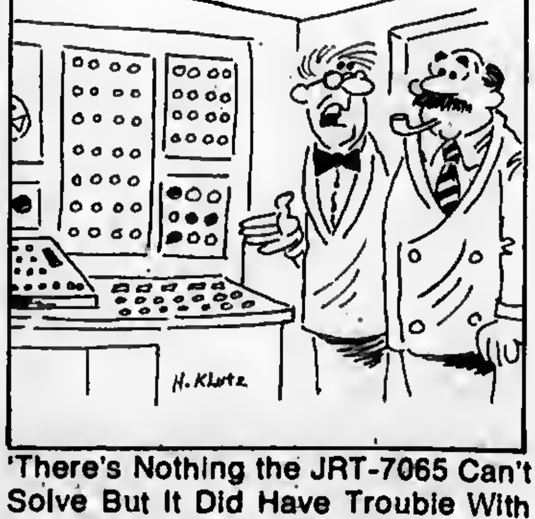
That is indeed a pity because the technology represents a major technological revolution and merits wise attention to its legal ramifications promptly and constantly to avoid the adverse consequences of oversight.

We haven't even begun to identify important legal aspects of the technology. That is indeed a pity because we have a unique opportunity with our awareness of the significance of the phenomenon.

Responsible computer professionals should demand legal attention to their activities, technology and industry at a level commensurate with its significance. They should avoid being distracted by futile tilting at windmills.

As far as sales taxes are concerned, the important task is to create a genuine understanding of the natures of the wide variety of transactions in the computer industry so sales tax administrators can determine whether they are covered by existing tax structures and so legislatures can adopt intelligently formulated new statutes when they want to expand the laws to cover the new types of transactions of the computer age.

Freed is a Boston attorney.



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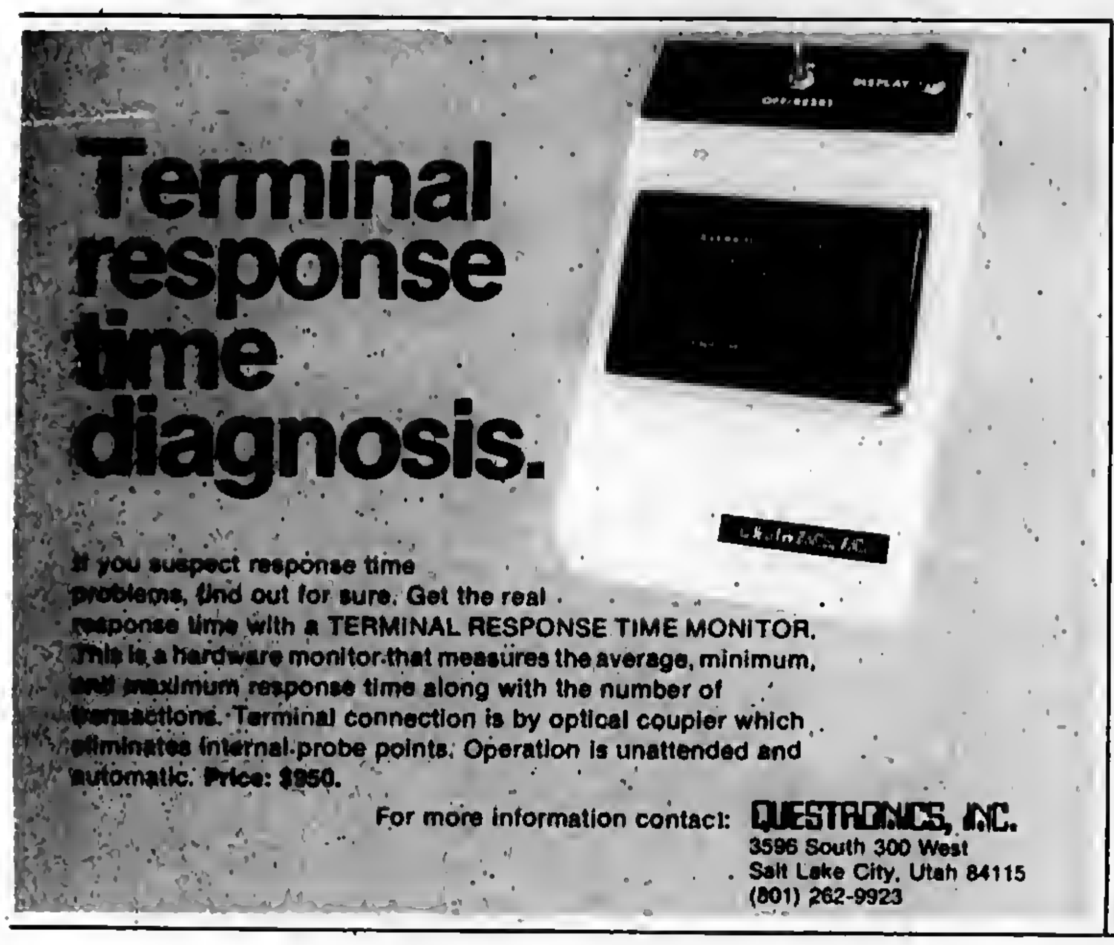
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'Mark IV' Easier to Use, Efficiency Up

By Don Leavitt
CW Staff

CANOGA PARK, Calif. — Enhancements built into Release 7 of Mark IV now being distributed by Informatics, Inc. make this update the most significant in the product's history, in the view of one company spokesman.

Mark IV is a general-purpose software system for the design, implementation and operation of DP applications. Developed to replace Cobol and PL/I, it provides users with more structure than those languages but less than RPG, the spokesman noted.

The Release 7 changes affect the system's ease of use, its efficiency, the support it provides to transaction processing and the data base management systems with which it interfaces.

The system has been adapted to additional operating environments and special features due out shortly will handle queries through IBM's CICS or Informatics' Intercomm teleprocessing monitors, the spokesman said.

Added Flexibility

To add flexibility, the capabilities providing source statement retrieval have been fully integrated into the Mark IV maintenance routines, he stated. Although the system will show when reorganization might be advisable, the "when" and "how" of the reorganization is still the responsibility of the user, he added.

To work temporarily with a variation of an existing file, users have been provided with a key field override facility. A new key can be specified and used throughout the run without physically reordering the records.

A grand summary override now allows users to block the printout of grand total figures that are accumulated by the system but which are not always meaningful to the using organization, according to the spokesman.

To enhance the efficiency of Mark IV, some areas within the processing phase create compiled code which can be handled more quickly than the interpreted code used in most of the system.

On the external side, Mark IV now supports the additional sort capabilities offered by IBM for OS and VS and handles tape positioning for DOS shops, the spokesman said.

The interfaces to both IBMs IMS and Cincom Systems, Inc.'s Total data base management systems have been enhanced. The IMS changes allow users to establish new request types. The system can now cope with logical records greater than 32K bytes and it generates sensitive search arguments, he added.

Total users can now follow sign-on rules provided with their data base system and their "logical views" of the data base can be greater than 32K bytes.

In-house security rules developed for use with TSO are also now acceptable to Mark IV, he noted. Both OQL and BQL for queries through TSO have been enhanced, he added.

Mark IV has been previously implemented across a wide range of mainframes; Release 7 can be used under Univac's OS/3 and under BS1000 on CII equipment in Europe, the spokesman said.

Mark IV ranges in cost from $22,000 to $39,000 for non-VS installations and from $23,500 to $41,000 for Virtual-oriented shops, with variations based on features selected.

Informatics is at 21050 Vanowen St., Canoga Park, Calif.

Seminars to Show

User Satisfaction Can Be Measured

NEW YORK — A method of measuring user satisfaction with a DP project will be discussed by Gerald M. Weinberg, Donald Gause and Daniel Freedman, all of Ethnotech, Inc., in a series of one-day seminars to be given in a dozen cities in the U.S. and Canada in the next three months.

The method works and is therefore a significant advance in the area of user-DP technician relations, the researchers contended, adding that having been able to measure satisfaction at one point in time they are now able to apply their technique on a continuing basis.

The technique has been refined to the point that it can report the degree of satisfaction felt by one member of the end-user group or by the whole group, according to a spokesman for the seminar sponsor, TSI Sales and Marketing, Inc.

It can also focus on the degree of user satisfaction with any of several individual aspects of the project being monitored, he said.

Since they developed the measurement method, the Ethnotech team has also been able to identify ways of increasing the degree of user satisfaction and this will also be covered in the seminars, they said.

The goal of the seminar is to produce an average increase in user satisfaction of 1% within the first week after the course and 5% within six months, according to TSI.

Weinberg, perhaps best known as the author of *The Psychology of Computer Programming*, has completed a book on problem definition with Gause and a handbook on review procedures with Freedman. These will be among the materials distributed to attendees at the seminars, TSI said.

The current schedule calls for presentations in Montreal, Washington, D.C., Chicago and San Francisco in early December. In mid-January, the seminar will be given in Toronto, Atlanta, Houston and Los Angeles.

New York, Cleveland, Minneapolis and Seattle will be the cities toured in early February.

Citing "current involvement in user-DP interaction" as a prerequisite, TSI has set a registration fee of $195 per attendee. More information is available from the company at 19 W. 44th St., New York, N.Y. 10036.

'Create' Builds DG Reports

EL SEGUNDO, Calif. — A report generator package that builds Business Basic programs on Data General Corp. minicomputers, Create was developed by Compusource Corp. here.

Designed for use on either Nova or Eclipse systems, the package starts the program building operation by allowing the user to define the file to be used and then answer a series of questions about the desired report format and content.

Create provides access to both record selection and sorting logic. Answers to one of the questions may include selection criteria while responses to another can call for records to be in either ascending or descending sequence.

The generator works on a load-and-go basis. It begins to produce the desired report "within minutes" of getting the user's answers, according to a spokesman's estimate.

The package costs $1,250, which includes a user's manual and correction of any errors detected within 90 days of purchase, he said from 2221 Rosecrans Ave., El Segundo, Calif. 90245.

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'Data Analyzer' Macro Support Enhanced

MONTVALE, N.J. — Version 5.2 of the Data Analyzer retrieval and reporting system from Program Products, Inc. (PPI) includes an enhanced macro processor, a set of syntax editors and support for recursive use of the system's capabilities.

A macro processor, allowing users to create instructions to suit their own needs, has always been an integral part of the IBM 360/370-oriented Analyzer, a spokesman noted. But the enhanced processor now supports arithmetic operations — which were not available previously — and extended logical functions.

The system includes facilities for complete editing of atributes specified in macro parameters, the spokesman said. This contrasts with earlier versions in which edit facilities were so limited "we really didn't do any checking," he volunteered.

One of the most useful features of Version 5.2, according to the spokesman, is the support for keyword, rather than positional, parameters in setting up the macros. Good use of keywords generally allows broader use of default options and therefore less coding for common situations, he said.

Support for recursive operations should also result in less coding, he added, explaining that now macros can call macros and sets of macros and individual instructions stored as procedures can call other "procs."

Used in a DOS setting, Data Analyzer can function with as little as 72K bytes of main memory, "but it prefers about 125K," the spokesman said. DOS users generally spend about $24,000 for the Analyzer and the options they want, he estimated, but a minimum package for this environment costs $16,000.

OS installations require 120K, "probably should allow about 140K" and typically pay $26,000 for an Analyzer package configured the way they want it. A basic OS package can be acquired for $18,000.

The capabilities being introduced in Version 5.2 of the Analyzer will be included in Audit Analyzer, the specialized release of the Data Analyzer for the auditing profession, but PPI is not ready now to set a delivery date for the enhanced version of the secondary product, the spokesman stated.

PPI is at 95 Chestnut Hill Road, Montvale, N.J. 07645.

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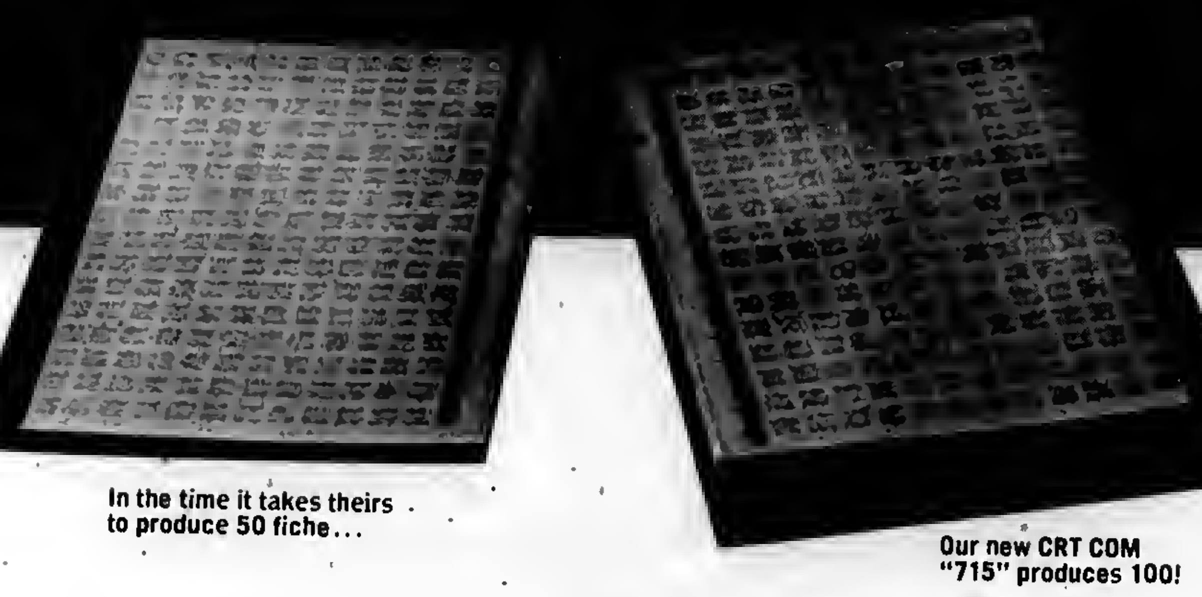

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3350s Eyed By Package

SUNNYVALE, Calif. — Diskplay, the Boole & Babbage, Inc. package that allows IBM DOS and DOS/VS users to know the location of current data sets as well as free space on their disks, has been updated to include support for DOS/VS Release 34.

The package will now support a broad range of disks including IBM's 3350. Other units monitored by Diskplay are the IBM 2311, 2314, 3330 models I and II, 3340 models 35 and 70 and 3344 and compatible drives, as well as the Telex 5625 and Itel 7330 Model 12, a spokesman said.

Diskplay creates and prints a listing of the data sets on a disk by sorting its volume table of contents (Vtoc). The tabular printout shows characteristics including percentage of independent overflow in the indexed sequential files while another, more graphic output shows the relative size, relationship and unused portions of each file, the vendor noted.

The package costs $495 and can be ordered from the company at 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

'CMLIF' Eases IBM 3 File Work

MILLTOWN, N.J. — CMLIF, a file maintenance utility package from Soft Pack 3, frees the IBM System 3 user from the "constant drudgery" of writing file maintenance and file listing programs, according to a spokesman.

The package generates three programs for each file defined to it. These programs perform the required maintenance work, produce a formatted display of the contents of records in the file (within user-specified limits) and produce a dump of the entire file.

CMLIF also produces much of the documentation needed to utilize the generated programs. One output of the package is, for example, a record layout of the file while another is the keypunch-oriented forms needed to enter the maintenance transactions.

CMLIF is normally distributed in object form tailored to the user's system. A license for the software ranges in cost from $399 (for mail-order customers) to $1,900 (for customers requiring on-site training and service).

The RPG-II source code is available for a user's internal use for $5,000, Softpack 3 added from 10 Desmet Ave., Milltown, N.J. 08850.

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Central Program Eases Heavy 'Omegamon' Use

MARINA DEL REY, Calif. — A "slave output" capability in Release 9 of the Omegamon software monitor from Candle Corp. enables users at various locations in an IBM MVS environment to track system activity from a single central copy of the monitor, according to a spokesman.

Previously each user had to work with a separate copy, he added.

Omegamon works under IBM's Time Sharing Option (TSO) through local 3270 CRTs or through dedicated 3270s via EXCP. Running through EXCP allows the monitor to function even if there is a breakdown in the access method in the user's system, the spokesman explained.

Under either mode of operation, users can work with a set of commands to extract data on how well the system is running. They also have the ability to save and recall screen formats, showing prior activity, through program function keys on the 3270.

Performance factors to be monitored and reported are user-selectable so the analysis available through Omegamon is customized to the actual needs of an installation rather than generalized for all sites, the spokesman said.

In addition to identifying factors to be tracked, users may set thresholds so reports are not produced until the system exceeds the specified values.

That means the operator can be alerted to critical situations without being swamped by output reporting that things are going within normal limits, the spokesman explained.

A tutorial facility through which Omegamon users have been able to invoke immediate examples of what factors might mean, in terms of the actual system on which the tutorial is being run, has been broadened under Release 9. Now the system can direct output to the printer, creating customized manuals, the company said.

Omegamon is an evolving product and the $5,000 annual lease fee entitles users to enhancements as well as maintenance on existing facilities, the Candle Corp. spokesman said from Suite 401, 4676 Admiralty Way, Marina Del Ray, Calif. 90261.

HP System Handles Orders

PALO ALTO, Calif. — Order entry software for the HP 9896 Business Information Management System has been introduced by Hewlett-Packard Co. for small distributors and manufacturers.

The package is integrated directly with the HP 9896-oriented accounts receivable and inventory control software previously available from the company, a spokesman said. The order entry software uses the "receivables" customer data base and the inventory control parts list, he explained.

Beyond that, every order transaction updates the other application files and ultimately impacts the user's general ledger processing, he said.

The order entry package for the desktop HP 9896 costs $500. Other financial information and control software (Fics) — including general ledger, accounts payable, payroll, accounts receivable and inventory control — cost a total of $1,300.

The computer system, including both hardware and the Fics software, can be leased for $577/mo. Delivery can be made in six weeks, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

'SCSS' Runs On DEC CPU

CHICAGO — SCSS, the conversational statistical and tabulation system introduced by SPSS, Inc. for IBM OS users [CW, Sept. 26] and later adapted to the VM/CMS environment, has now been modified to run on Digital Equipment Corp. Decsystem-20s as well, according to a spokeswoman.

Conversion of the software — written largely in structured Fortran — to other systems is being considered or is underway, she added.

With all releases of SCSS, utility routines will be provided to convert system files built up during use of the earlier batch-oriented SPSS to formats required for conversational analysis, she noted.

SCSS is available for an annual, renewable license fee of $4,000, which drops to $1,500 for tax-exempt organizations and $1,000 for academic institutions, SPSS, Inc. said from Suite 1234; 111 E. Wacker Drive, Chicago, Ill. 60601.

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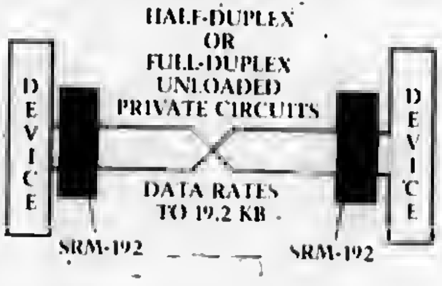

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User Banks on Benefits From DBMS Swap

Special to CW

NEW HAVEN, Conn. — A bank here has converted one of its primary applications from IBM's IMS to Cullinane Corp.'s IDMS data base management system and the benefits have already been well worth the effort, according to the man responsible for the changeover.

Based on the first success, other conversions are being planned, Bill Sposili, an assistant vice-president and DP manager at the First Bank, said recently.

Switching the software underlying the on-line Customer Information File (CIF) operation has saved roughly half of the virtual storage on one of the bank's two IBM 370/145s and that has provided the opportunity to do a lot of processing that just couldn't be done before, Sposili added.

Like many banks, First Bank relies heavily on its system. It brought the application on-line in 1975 to provide timely, accurate response to questions dealing with basic data: customer names, addresses, active accounts, credit lines and so forth.

About a quarter million customers and 170,000 individual accounts were cross-referenced by the system, which used IMS/VS DB/DC as its data base management system.

By late 1976, "any expansion in the CIF application would force us to a larger machine to more main memory," Sposili said. The system was then consuming approximately half of a 768K IBM 370/145 and several groups within the bank were dissatisfied:

- Entry operators working at 16 IBM 3270 terminals were unhappy because of poor response times — then a minimum of five seconds and sometimes as long as 20 seconds.
- Programmers were frustrated because they could not compile or test on the same machine during CIF processing; batch partitions often were not available because a simple compilation produced discernible degradation on the CIF side.
- Operations personnel were irate because getting all the work done was increasingly difficult in spite of having two machines.

The problems mostly involved in the data base and data communications system. Largely because of excessive real memory demands by IMS paging activity under OS/VS1 increased and "thrashing" lay at the root of most of the response problems, Sposili said.

In addition, because of required data base and data communications programming, individual programs within the CIF system were growing larger, making matters worse.

Pair of Packages

Instead of bringing in a larger machine or adding more memory, First Bank assessed its data base needs to see what else could be done. Since the data base system should work closely with the teleprocessing (TP) software, the question of which TP monitor was also addressed.

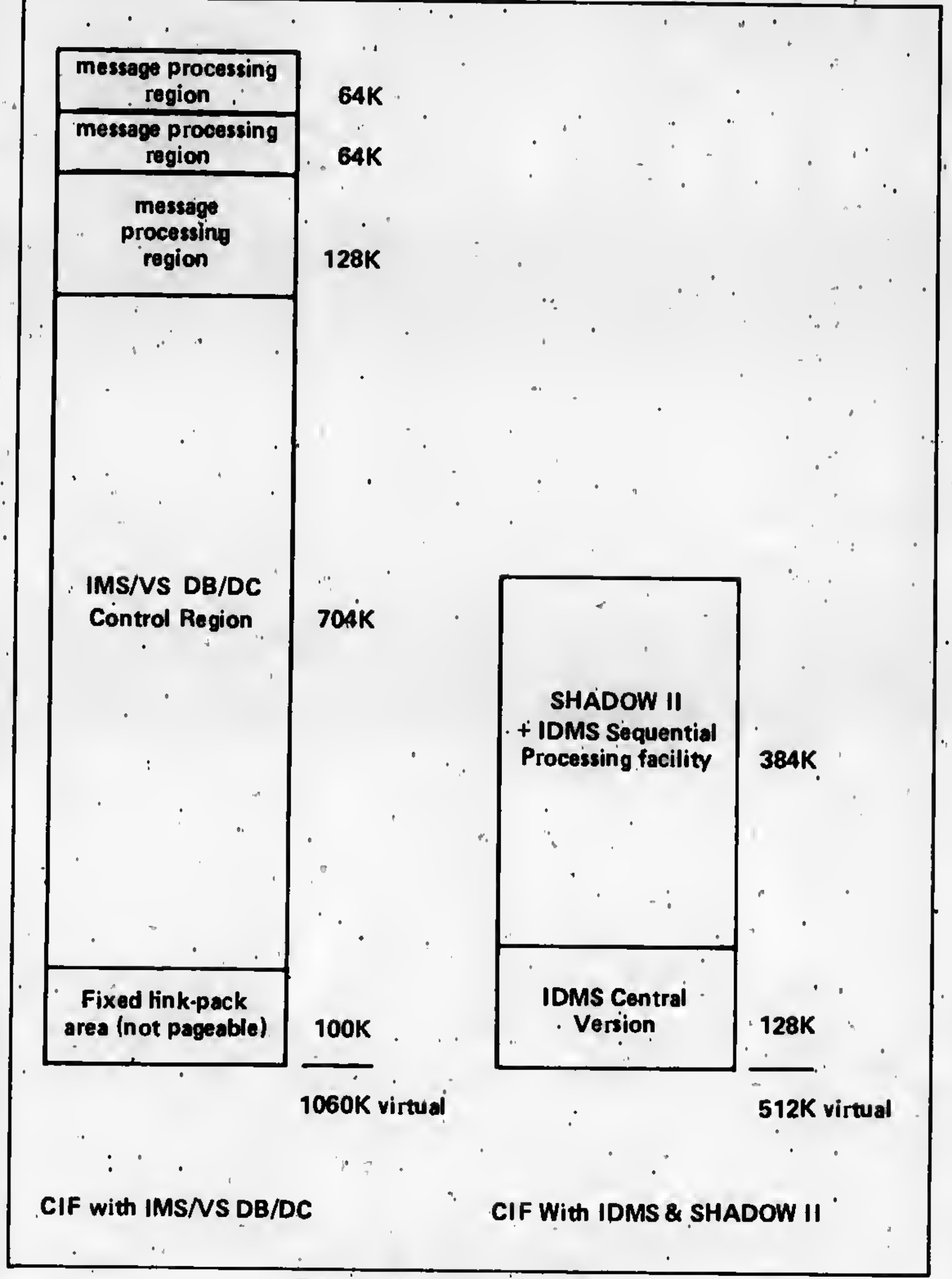
After an evaluation of a number of available data base and data communications systems, First Bank selected IDMS and the companion TP monitor, Shadow II.

On paper, it looked as if that pairing would consume about half the resources being used at the time, an assessment which has proven accurate in "real life."

Tom Puddicombe, systems officer, noted some other features that attracted First Bank to IDMS:

- Its English-like Data Manipulation Language. As an extension of Cobol, no coding at the CALL level is required.

(Continued on Page 28)


message processing region
64K
message processing region
64K
message processing region
128K
IMS/VS DB/DC Control Region
704K
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100K
1060K virtual
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Bank Saves CPU Upgrade by DBMS Switch

(Continued from Page 26)

• Data Definition. Once defined to the IDMS schema, data items do not need to be redefined to the system. The programmer is relieved of a time-consuming burden and standardization becomes much easier, Puddicombe said.

• Data Dictionary. The data base administrator is given a set of reporting tools for everyday use showing which programs use what parts of the data base and what view of the data base a particular program has.

• Data independence. Data items can be added to records and relationships between records can be added or changed without affecting existing production programs.

• On-site training. Hands-on training is available for programmers and analysts, using actual First Bank applications as a basis for class workshop sessions.

The Conversion

IDMS was installed in February, and in-house training began immediately. Special emphasis was placed on the then newly-announced IDMS Sequential Processing facility to accommodate the bank's need to access customer and account information from various directions (e.g., account number, customer name, etc.).

Within a week, most of the data base design phase was complete; an IDMS data structure — using 17 discrete record "types" and 12 kinds of "relationships" spread across two data base "areas" — had been created to mirror the bank's operations.

One area of the data base was assigned for basic customer data, and the second was assigned for individual account data for demand deposit, savings, time deposits and club accounts. Two secondary record indexes were included, one for generic retrieval on all or part of a customer name and one for access of multiple accounts from a single customer/account reference number.

The next conversion involved the programs themselves. Estimates for converting the 21 on-line and seven batch programs from IMS to IDMS/-Shadow amounted to about 93 person-days.

The actual conversion took approximately 100 person-days, involving three individuals. Except for some telephone support from Ron McKinney at Cullinane's Wellesley, Mass., office, Puddicombe noted "no significant degree" of vendor assistance was required for his team to complete its conversion project.

At the same time, Puddicombe used the conversion process to entirely rewrite four heavily used and inefficient subroutines involved in customer-key checking and validation. By replacing these modules with well-designed and efficient assembler routines, main storage required was reduced from about 8K to less than 2K.

The Results

Since the system went live, the benefits of the conversion have become dramatically apparent, according to Sposili:

• Response time for on-line transaction processing programs is instantaneous most of the time and 2 or 3 seconds during peak periods.

• Average program size dropped to 16K or less, compared with the 30 K-to 40K which was the rule with IMS. The data base and data communications system software itself occupies only a fraction of the storage it did under IMS.

Thirty percent to 50% more on-line transactions can be accommodated, Sposili said, and more batch job streams can run on the same machine without degradation.

Even the heavily CPU-bound "proof in transit" application can execute on the machine while the on-line system is active without severely degrading respone times.

• Compilations and other development jobs can now run easily in the same machine during the day, even while the on-line system is operating.

• One and a half persons have been freed from full-time technical system support of IMS to do applications programming and support. Support for IDMS and Shadow is handled by one person on a part-time basis.

Success of the CIF conversion has been a big boost toward wider use of data base management in other aspects of First Bank's DP, according to Sposili.

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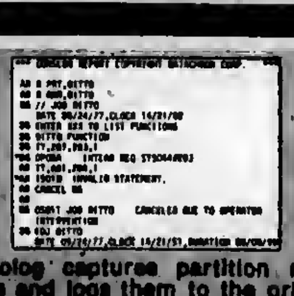

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User Can Pick CPU, Mode

Versatile DBMS Enhances Information Center

By Diane B. Farmer
Special to CW

One of the best methods of solving today's information problems is to implement a good data base management system (DBMS). DP personnel and upper management are becoming aware of the necessities and niceties of having a comprehensive, yet flexible DBMS.

Activities in an information center and library require having data well organized, easily understood and above all readily available to patrons. The number of requests for help in information services is overwhelming. Since most information groups are limited in manpower, DBMS becomes essential to daily operations.

The requirements of Polaroid Corp. in selecting a DBMS included rapid accessibility of the data stored, simplicity of use by department members (eliminating the need for programming staff), ability to compile a variety of reports and indexes in various formats, ability to cope with a tremendous amount of textual material in addition to numerical data and availability of the software to operate on our in-house facilities. Cost of the software was also a factor.

After several software packages were reviewed, the decision to purchase DRS, a data retrieval and management system, was made. DRS is provided by Aeronautical Research Associates of Princeton (Arap), Princeton, N.J. It is a generalized, highly sophisticated, yet easy to operate, user-oriented software package.

DRS operates on several types of computers and is available by time-sharing. We are familiar with operations on the General Automation 18/-30, the Digital Equipment Corp. PDP-11, the IBM 370 and time-sharing at Itel/Multiple Access, Inc. in New York.

The system has helped us cope with the increasing activity in the services our department offers. We have found it a useful tool in organizing data in all areas of our department.

The following are some of the problem areas which faced us but which were resolved by using the DBMS.

- Controlling the constantly increasing library book loan program, providing statistical data of usage.
- Controlling the journal circulation, preparing route slips, simplifying yearly subscription orders, determining the accuracy of the data and appropriateness of persons receiving the journals.
- Producing for company wide distribution a bibliographic listing and key word out of context index to selected published photographic articles of interest, using this data base as a tool for literature searches.
- Maintaining literature searches being handled, indexing current and past searches for future reference, producing statistical analysis such as trends and times spent per search.
- Maintaining data filed by the Chemical Information Group, including the Wiswesser Line Notation system and a chemical registry system. More information on this aspect of our activities can be found in "DRS — A User Oriented Information Retrieval System," by G. Szonyi, *Journal of Chemical Documentation* 14 (79), 1974.
- Producing guides to periodicals in the library, including how they are kept, i.e. hardbound, microfilm, microfiche, where shelved and extent of our holdings.
- Indexing and categorizing of technical files for ease in retrieving the files. Aiding in expansion studies of the files.
- Organizing requests submitted to the Polaroid Foundation. Aiding foundation members by producing budget data, agenda and minutes for the meetings. Producing analysis of the trends in giving, areas of interest, etc.
- Organizing the Product Donation Program and the Matching Gifts Program handled by the Polaroid Foundation.
- Producing indexes for reprint collections, monthly reports requiring indexes and other groups of related data needing organizing.

User Controls

DRS is a modular software package allowing enhancements easily. It is truly an interactive DBMS prompting the user each step if necessary. DRS has the capability to select a portion or subset of the data base according to the user's specifications. The records can be arranged or sorted in a variety of ways as the user wishes.

The system offers two standard formats for output on either the console or a high-speed line printer. The List format is columnar in form and the Doclist format is horizontal, placing the data across the page.

Output may also be to a magnetic tape or disk file for accessing at a later time. The execute command is given to instruct DRS to ouput the selection. Controls can be used in conjunction with this command such as skipping lines between records, altering page numbers, ejecting to a clean page when finished. These commands — select, arrange, list and execute — are the basic commands in DRS.

As the user becomes more adept, functional and utility commands may be used. These commands allow such functions as inputting of headings, changing formats, computing numerical data and storing results in the data base, and translating the contents of a field during printing. The system has the capability to link to a user-written program, such as a Fortran program, and return results to the data base.

The system can generate a complete data base ready for data input when given certain parameters by the user. If all parameters are not given, DRS will supply a default parameter. No highly technical knowledge is required to generate a data base. Since the system is interactive, it will prompt the user during the specifying of the parameters if so desired.

Another excellent feature is the ease of data addition or changes. Records may be input in free-field format, fixed-field format or a combination of both. Special input formats can easily be prepared to accommodate data used in other systems.

The data base contains a number of related records. A record constitutes a number of fields determined by the user at system generation time. Changes in records (modifications) are handled by altering only the fields desired, using either a unique identifier which is user specified or the record key which is automatically assigned.

The deletion command actually eliminates the entire record from the data base. This deletion can either be specific by using record key numbers or by using a selection statement governed by criteria supplied by the user.

Security can be as elaborate as the user wishes. Restrictions can be placed on accessing certain proprietary portions of the data base. If so desired, fields within the records may be restricted. Or the data may be available all the time, but data changes, such as additions, modifications and deletions, may be secured.

Farmer is an associate operations specialist at Polaroid Corp., Cambridge, Mass.

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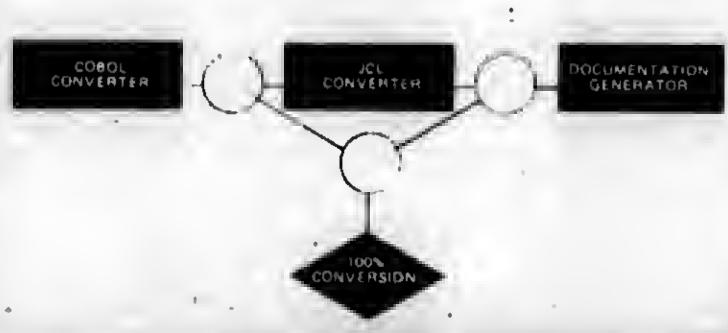

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Offers Data Base Service

User Joins Turnkey CRTs, Packet Net

By Ronald A. Frank
CW Staff

WOODLAND HILLS, Calif. — A terminal user here has combined a packet network service and turnkey terminal systems to provide customers with specialized DP capabilities.

Marketron is a firm which provides DP capabilities to the radio and TV industry. It provides two primary services called Act I and Act II, according to Jim Foley, vice-president.

Act I includes a data base of the latest radio and TV ratings compiled by such firms as Nielson, ARB and The Source. Subscribers to Act I access the Marketron data base, stored on a Digital Equipment Corp. Decsystem-20 using a variety of 30 char./-sec terminals on the Telenet Communications Corp. network.

A Telenet Terminal Access controller (a Timeplex T96 multiplexer) connects Marketron to the packet net.

CW Photo by R. Frank

James Foley shows how CRT is used with Act II system.

The data base is accessed by about 230 users, which include radio and TV stations plus sales representatives. The data is used to analyze audiences so commercials will have the most impact, Foley said.

Act II is a CRT-based system which uses a Cincinnati-Milacron, Inc. minicomputer. The turnkey system includes a 32K processor, 10M-byte disk, General Electric teleprinter and up to three CRTs.

The Act II system keeps track of commercials for about 62 radio stations and makes sure similar products don't run in adjoining time slots. The system also includes accounting and billing capabilities and is installed on-site at radio stations.

Marketron takes advantage of the rugged environment in which the CRT system can operate in a different manner. A complete operating system is installed in a Marketron van; when a prospective customer shows an interest in Act II, the van can be driven to any site in the country for a demonstration.

By allowing a prospective user to sit at a CRT in the vehicle and actually operate the equipment, it is much easier to show what the system's real capabilities are, Foley said.

Three Versions

Act II comes in three versions depending on storage. The smallest version is called System 14 and contains three floppy disks; it sells for about $32,000.

The medium-size version is called System 42 and contains four double-density floppy disks; it costs $45,000 or leases for $1,950/mo. The largest is called System 100 and is a lease-only system that ranges in cost from $2,600- to $3,500/mo with a cartridge disk storage subsystem.

The Cincinnati-Milacron mini was programmed in Assembler language and the instruction set is in a hexadecimal format that looks very much like an IBM 360 or 370 instruction set, Foley said.

By combining the packet services of Telenet with a mini-based system, terminal users with various needs can be served, Foley said. Marketron is at Suite 1020, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Penney's, Korvettes Expanding Their Use of POS Systems

By Molly Upton
CW Staff

BOSTON — Two large retail firms are happy with their point-of-sale (POS) terminal systems and networks and are expanding their use of POS equipment, according to speakers at a meeting of the Boston Retail Analysts Group here recently.

Although J.C. Penney's and Korvettes have different orientations, they have been able to utilize POS terminal systems to serve their needs, representatives of both firms indicated.

"I'm not sure Korvettes could have survived in the last three or four years without POS," Monty White told the group. White is manager of information services for the retail firm.

Korvettes has made significant cuts in personnel and reduced its inventory by about $20 million in the last two years, White indicated. The firm has put some of these savings into expanding its centralized buying operations, but "I don't think some of these would have taken place if we could not have done some pruning," he added.

J.C. Penney's has justified its expenditures on POS through hard savings alone in "substantially less than five years," according to Gerry Montgomery, manager of the systems programming technology service department. In the long run, the information gained will be more important than the hard savings, he said.

Penney's has achieved its three original objectives for POS of improving customer service, store productivity and information to all levels of management, Montgomery stated. The firm began using POS in August 1972 with NCR Corp. equipment; it now has more than 300 stores and about 12,000 terminals in place. Penney's philosophy dictates having multiple vendors for its POS gear, Montgomery noted.

All new stores are equipped with POS and the firm is accelerating the pace at which it installs POS in its existing stores, he said.

The average Penney's POS installation has 30 to 40 terminals with a 96K in-store mini and a 20M-byte disk, he added.

(Continued on Page 32)

IBM 3790 Gains Magnetic Tape

WHITE PLAINS, N.Y. — Users can now attach up to four IBM 3410/3411 magnetic tape units to an IBM 3790 terminal system, complementing the controller's disk storage, the firm said.

The tape units can be used as an I/O medium for the 3790. Data that is processed only periodically can be stored off-line, making more space available on the controller disk for on-line processing, according to a spokesman.

If a job is to be run on a central CPU, the data can be transferred from the 3790 to a tape, which then is transported to the main site. The tape medium also provides an enhanced backup and restore capability for the controller disk, IBM said.

The enhancement provides for the attachment of one 3411 Model 1 magnetic tape and control unit and up to three 3410 Model 1 magnetic tape units, depending on the particular 3790 configuration.

The tape attachment capability requires two special features which can be leased for a total of $225, rented for $265 or purchased for $9,090. They will be available in June.

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To Handle System Growth

Medical Center Using Mini as Concentrator

WINSTON-SALEM, N.C. — A minicomputer serves as a communications concentrator for the Bowman Gray School of Medicine/North Carolina Baptist Hospital Medical Center here.

The Data General Nova 3 allows terminals to be added at various clinics in the hospital without degrading terminal response time. In addition to verifying insurance information in a time-sharing environment, the system prints out claim forms in batch sequence, provides complete patient history and performs general ledger, accounts payable and accounts receivable applications, according to Dick Gardner, DP project leader.

Baptist Hospital/Bowman Gray is a regional medical center with 650 beds and 23,123 patient admissions a year. An additional 206,547 ambulatory patient visits were made to the medical center in a year. The medical center is involved in the education of 397 students pursuing the M.D., M.S. or Ph.D. degrees as well as students in several allied health programs, Gardner said.

Anticipated future growth at the medical center created the need for a computer system that could adapt to increasing demands on its capabilities.

The system consists of the Nova 3 configured as a communications concentrator for a Honeywell Information Systems 6000 host computer. The system presently provides 40 terminals with 2- to 5-second response time. System expansion can be accommodated with the simple addition of dumb terminals and minor additions to the Nova, with no resulting increase in response time, according to Gardner.

Communications between the Nova 3 and the HIS 6000 host is accomplished on two 9,600 bit/sec synchronous lines. The mini can communicate with 75 Dasher display terminals and an additional 80 printers over asynchronous lines.

Terminals in Clinics

Approximately half of the terminals are located in doctors' clinics in the medical center, where they are used for professional billing, retrieving pertinent patient information and verifying insurance claim information. Since each clinic operates as an individual entity at the Bowman Gray School of Medicine, the computer system must handle 26 different clinics staffed by a total of 130 doctors, each of whom can bill patients, Gardner said.

Future plans at the medical center are to add on-line admissions, medical record retrieval, dietary restrictions, laboratory tests and other departments to the system. Some of the resulting data will be used for statistical surveys.

The HIS 6000 computer was originally used for batch and time-sharing system applications. The alternatives evaluated for upgrading it to handle a large amount of on-line processing included hard-wired, multidrop communication lines, direct lines or an intelligent front-end concentrator. The minicomputer concentrator was chosen, according to Gardner, "because its cost was less than half that of the other alternatives and it provided the best solution to our anticipated growth."

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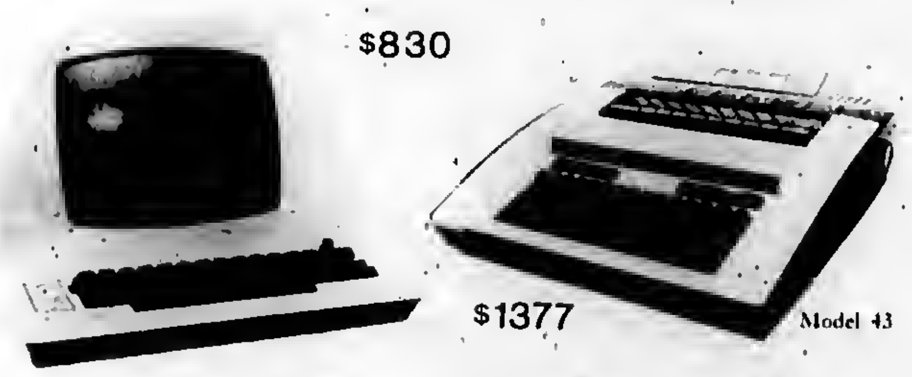

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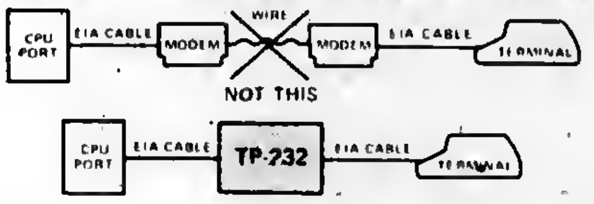

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Two Retailers Expanding Their Use of POS Systems

(Continued from Page 31)

Penney's uses its systems, which are linked via a nationwide network, for credit and check authorization purposes.

For credit authorization, the firm has 23,000 terminals, one half of which are POS. Response time is 3- to 5 sec when the inquiry is made in the same region as the data base and 5- to 7 sec when it is from outside the area, Montgomery said. Penney's network is now handling about 150 million inquiries/year.

At night, the minis process the data collected, performing sales audits, descriptive billing and some analysis of item sales. Item sales are then fed into a data base for use by central buyers.

Penney's has about 50 stores with 1,500 optical character recognition. The retailer has been testing readers and printers for years and that printing technology is now in pretty good shape, Montogomery said.

POS has enabled Penney's to improve customer service, he indicated.

POS Instead of People

But Korvettes, which is a chain of 58 promotional department stores with a centralized philosophy, is not service-oriented, White indicated. "In place of people, we are using systems," he said. All of the stores are 100% POS and the primary goal is replenishment of merchandise via the central buying facility.

The firm also has used the records retained from the POS system to help it anticipate staffing needs, especially around holidays. The information is specific as to hours of the day, White added.

As a consequence of the POS record-keeping, the store is able to use more part-time employees to carry it through the peaks and valleys of shopper volumes, he said.

"I think we have used the flow of statistics and the psychology of POS to help service," he said.

White estimated Korvettes has halved or cut by two-thirds the costs of alternative systems while receiving more information. Its data processing costs have been "dramatically" reduced, he said, citing alternative system costs of printing punched tickets.

Korvettes goal is a paperless store and White feels the firm has attained one-third of that. There are no visible sales slips, he indicated.

Billing is descriptive — papers only move when there is a question, he said.

White told the meeting NCR has been slow in providing a price lookup capability. Ultimately, the firm would like to tie in "nuisance" paper work with the central system, but that requires a second network, he explained.

A decade from now, White sees a totally automatic order replacement system, with warehouse positions available to the buyer in the central facility rather than to the individual store.

The firm relies on its POS records to aid in purchasing 98% of its hard goods, he indicated.

In providing retail services, the systems have reduced telephone calls for credit checks by 95%, he said. By about the first of the year, White expects to have the credit system's data base hooked to Master Charge. so it can provide positive feedback on credit authorizations.

Korvettes set up its system so any merchandise can be sold from any register, White thinks the firm has reduced errors at checkout counters, and Korvettes soon plans to implement a scheme that will compare sales prices against the master price list to eliminate pass-throughs, or those instances where the clerk charges specific customers less on certain items.

POS data can be used to show some foibles, such as how a particular clerk grants credit authorizations, he said.

Data 100 Batch Units Get 374X Read Option

MINNEAPOLIS — To enhance its communications capabilities, Data 100 Corp. has added the ability to transmit data on IBM 374X formatted diskettes in a Hasp or 3780 mode via the company's remote-batch terminal systems.

The Hasp and 3780 enhancements, both of which utilize a self-contained dual-diskette reader cable-connected to the terminal controller, allow the user to display the contents of a diskette, read specified data or the complete diskette or multivolume diskettes, and transmit variable-length records from 80 to 128 characters in length.

The new 3780 and Hasp options, which may be field-installed, are each priced at $53 per month, including maintenance, on a one-year lease. Purchase price is $2,255, Data 100 said from 6110 Blue Circle Dr., Minneapolis, Minn. 55435.

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For RJE, Data Entry

Airline Builds Multifunction Net

ANCHORAGE, Alaska — Wien Air Alaska, operating in a state that has one of the lowest percentages of on-site computer usage, has built a multifunction data entry and remote job entry network.

Using a Data 100 Corp. Keybatch System here linked via satellite to a Continental Air Line's computer in Los Angeles, Wien Air Alaska has reduced job turnaround from as much as a week to a few hours and reduced batch errors from as high as 30% to less than 5%, the airline said.

At the same time, it has developed data entry programs to handle most normal accounting functions, including the calculation of flight pay, and another system to keep track of its tape library nearly 4,000 miles away — all of this with practically no outside help, according to Mic Louther, DP manager.

The decision to abandon its bank service bureau relationship in favor of an RJE facility wasn't all the airline's.

"While we had a lot of the traditional service bureau problems, including long lag times on production work and tests maybe once a week, it was, overall, a reasonable relationship," Lowther recalled.

When the service bureau said, however, that because of its own in-house workload Wien would have to find other arrangements, "it was the happiest day in our life," Lowther said.

T/S the Choice

Wien then examined a number of alternatives ranging from using another service bureau to installing its own computer to RJE. Because it appeared to be the most cost-effective appraoch and because Wien was pleased with its service from Continental's on-line reservation system, it opted for the Los-Angeles-based carrier's time-sharing facilities — a move at least one other major airline had taken.

Finding a hardware manufacturer was both harder and easier. "Because not everyone does business up here," Lowther noted, "we quickly narrowed the field to IBM, Mohawk, Data Sciences, and Data 100.

"Since many vendors treat data entry and RJE as parts of a single process and design their machines accordingly, we decided to replace our contingent of keypunches and IBM 3741s as well. We could have beefed up the 3741s in terms of editing features, but the real advantage of the Keybatch system was that it was a perfect match to our needs," he said.

Data 100 received the nod ultimately based on software. "Because of the system's capacity for error checking, table lookups and range checking using sequential tables, in-line tables and Isam tables, we found we could eliminate three-fourths of our key verification," Lowther said.

Surprising Results

Wien's Keybatch system with 12 CRTs, two terminal control units, a dual 800 bit/in. tape drive, a 10M-byte disk and a 1,250 line/min printer has produced some surprising results.

To change airline schedules for Wien, the person responsible no longer fills out forms and travels to Los Angeles for every new change. Before the system was installed, the scheduler took 35 trips to Los Angeles over two and a half year period — all to ensure that the data and the resulting output was correct.

Now, 49 in-line tables validate the data as the scheduler enters it, the RJE system gets the data back and forth and he gets to stay in Alaska during cold winters.

A 600-statement Keybatch program now calculates the pay amount in less than a second compared with minutes it used to take, Lowther said.

In two specific areas — sales and payroll — batch error rates have been reduced from 30% and 25% to 4%. "But these figures are a little misleading," Lowther said, "because if there are any errors in a batch of some 300 records, the whole batch is kicked out."

Overall, data entry errors are minimal, he said.

After the data has been entered, it is transmitted at 9,600 bit/sec to the Talkeetna, Alaska earth station, then via RCA satellite to Point Reyes (San Francisco), Calif.

From there, the data is sent over land lines to Continental's IBM 360/65 computer.

While its $3,500/mo telephone bills are a function of Wien's seemingly distant location, there are other operating problems of being so remote. One of them is sufficient backup if the system fails.

Wien addressed that problem by adding a secondary 10M-byte disk and software to run Keybatch or RJE or both on either terminal control unit.

"While we are paying for a lot more equipment than we actually use," Lowther commented, "if we use the backup disk only five days a year, it pays for itself. Besides, with the peripheral selector, if one machine goes down, we can run data entry and/or RJE on the other."

Another problem is how to manage Wien's tape library in Los Angeles. To solve this, Lowther designed and wrote a system which does the job of tape librarian and setup clerk.

When any data is transmitted, it goes first into a setup program; identification records mark the beginning of data for separate jobs. Setup stores the input data on disk, then uses the ID record to extract JCL for each job from the OS procedure library. Once found, Setup scans the JCL for input and output tapes, assigns specific volume serial numbers for both from the tape library file, rebuilds the JCL with the necessary operator information and sends it directly into the Hasp reader.

Jobs then execute normally. Setup prints a new tape library listing each time and also maintains complete control over tapes sent offsite.

"It's been running a year now and we haven't lost a tape yet," Lowther said.

Transwriter Has Memory Wafers

TORRANCE, Calif. — A self-contained memory typewriter is available from Transaction Data Systems.

The Transwriter, housed within an IBM Selectric II correcting typewriter, uses memory wafers as its media storage, the firm explained.

The wafers are less than 2 in. long, 1 in. wide and .2 in. thick, but are capable of storing up to 20 typewritten pages, according to a spokesman.

The Transwriter has text-editing features such as autotab, stop codes, unlimited amount of new text that can be inserted and automatic lift-off correction and format, he said.

The Transwriter costs $2,995. Transaction Data Systems is at 2909 Oregon Court, Torrance, Calif. 90503.

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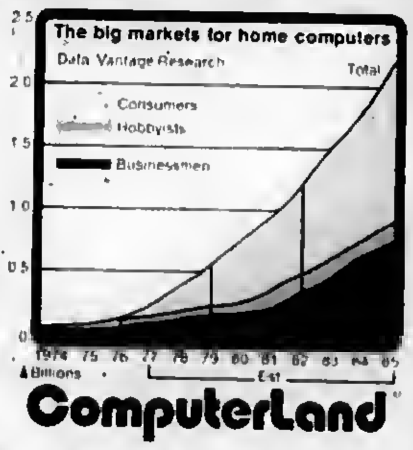

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Data Trap Eases Diagnosis

PROVIDENCE, R.I. — Hawk 4000, a data trap with a microprocessor that can diagnose communication problems, has been introduced by International Data Sciences, Inc.

The unit can monitor, transmit and receive data between a modem and a terminal using a 9-in., 512-char. screen, the company said. All switches are "stored" in memory and the device can handle full-duplex asynchronous, full duplex asynchronous and synchronous line rates.

The Hawk 4000 is priced at $9,975 from 100 Nashua St., Providence, R.I. 02904.

Boeing to Link Facilities Via Satellite

GERMANTOWN, Md. — American Satellite Corp. (ASC) will provide Boeing Computer Services, Inc., a subsidiary of The Boeing Co., digital satellite communications linking Boeing facilities in Seattle, Wash., Wichita, Kan. and Philadelphia, Pa.

The new network, according to Dr. M.U. Ayres, Boeing's director of network services, permits Boeing "to take advantage of recent technological advances in satellite communications."

The service will include direct computer-to-computer digital data transmission as well as digitized voice and facsimile at a basic transmission rate of 56 kbit/sec.

American Satellite will install and operate 5-meter-diameter antenna receive-and-transmit earth terminals at each location. The earth station electronic equipment is contained in a weatherproof enclosure located next to the antenna.

The agreement also provides for operational testing of a wideband (56 kbit/sec) version of American Satellite's Satellite Delay Compensation Unit (SDCU). The 56 kbit/sec SDCU, which is expected to provide an increase in data throughput efficiencies, is currently under development, ASC said.

CRT and Printer Combined

CAMPBELL, Calif. — Data Terminals & Communications (DTC) has announced the DTC-382 data communications terminal combining a CRT with a daisy wheel printer. With this unit, users can have the advantages of CRT operation and the ability to obtain hard-copy printout, the firm said.

The video portion of the DTC-382 holds four (optionally eight) pages of data, each 80 columns by 24 lines, which can be scrolled over the screen. Eight different field attributes can be used (high intensity, reverse video, blinking, underline, etc).

Insertion and deletion of characters and lines is standard as is sending from screen memory to either printer and/or the RS-232 line, the firm said.

The print mechanism is the Hytype II and a $250 option allows use of the metal print wheel word-processing version of the printer, which provides proportional spacing as well as 10 or 12 pitch.

Shadow printing, automatic underline and plotting are all standard features. The Model 382 prints forward and backward for faster throughput without the need for host programming.

Pricing at $5,000 for the unit. A keyboard send-receive version of the printer terminal starts at $3,750.

Options include pedestal stand ($100), word processing printer ($250), dual RS-232 interface ($250), clock/column and line indicator ($100), 8-page option ($750).

Leasing starts at $137/mo including maintenance. Deliveries of the Model DTC-382 are available in 30 days from DTC at 1190 Dell Ave., Campbell, Calif. 95008.

Polling System Bows

HOUSTON — A polling system that collects and stores data from up to 200 Series 700 Model 770 intelligent terminals and/or Model 742 programmable data terminals was unveiled by Texas Instruments, Inc.

The Model 704/1 terminal polling system (TPS) stores data in an IBM-compatible format. Following system start up, the TPS automatically polls and stores data on 9-track tape in a format compatible with host computer processing. The resulting output from the host computer can be distributed automatically via the TPS to the terminal network, TI said.

TI stated that the 704/1 TPS offers terminal users a means of transferring data to and from their host computer, while simultaneously relieving the host computer of the requirement to poll, distribute data and keep statistics.

The Model 704/1 terminal polling system consists of a TI Model 990 minicomputer with 48K bytes of random-access memory, a Model 979A 9-track 800 or 1,600 bit/in. tape drive and a Model 743 keyboard send/receive data terminal. The system accommodates up to four telephone lines using internal modems and autocall units, or user-supplied modems.

When a minimum of 10 Model 770 intelligent terminals or 10 Model 742 programmable terminals are purchased or leased by a TPS customers, the one-year lease rate for the TPS is $1,050 per month, with a basic purchase price of $13,000. Deliveries of the 704/1 TPS will begin in January 1978 from Box 1444, Houston, Texas 77001.

Surprise! Your 1100 LPM Printer used up $100,000 worth of paper this year.

CPU capacity may be getting cheaper; but computer supplies certainly aren't. Our example is true. An 1100 LPM printer running at full capacity will put out some 700,000 pages per month, at a cost of five to ten thousand dollars! (Small wonder that the charges for paper are often the biggest "surprise" in your DP budget.) The need for protecting your DP investment — often at considerable expense — has also increased. And that's why we've devoted our December 26th/January 2nd special report to the many ways to stretch your supply dollars, and safeguard your computer system.

Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
- An overview of DP media — what to look for, how to get it
- Pooling resources — how four companies share quantity discounts

We'll also look at the practical aspects of computer security in this report, with articles like these:

- Effective contingency planning — targeting danger areas
- Computer crimes and disasters — how to cut losses and minimize risk

If you're a DP Manager, MIS Director or Corporate Executive with responsibility for DP cost control and security, be sure to read the special report in our year-end combined issue. And if you market products or services that cut the cost of computing, or safeguard what's in the computer room — advertise in this report. Ad closing date is December 9. For details, call your Computerworld salesman. To reserve your ad space, call Terry Williams at (617) 965-5800.

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

MVS Gives Rainier Bank Performance Dividend

Rainier Bank's dramatic new 40-story headquarters building in Seattle, Washington, rises within sight of its namesake: 14,408-foot Mt. Rainier.

"We did an 'initial program load' of MVS one day and never looked back: Everything was absolutely smooth and problem-free."

William Anderson, manager of system research and technical support for Rainier Bank, Seattle, is describing the bank's recent adoption of Multiple Virtual Storage (MVS) for its two System/370 Model 158's. MVS is IBM's operating system for large computers and multiple-processor installations.

"Now we run the two machines as a Multiprocessor (MP) system, and we move more than a thousand jobs a day through the data center, meeting our schedules consistently. One operator runs the whole system, and machine productivity has increased greatly since we let MVS dispatch the jobs to balance the workload. To meet a deadline, MVS can dynamically apply all the power of the dual system to a single job."

"Since we introduced MVS," notes Frederick S. Haines, senior vice president and manager of information systems, "we've been able to add many major applications on these machines. Our performance monitors show consistent improvement under MVS. System utilization has increased and continues to increase, thanks in equal part to MVS and to the talents of our system programmers. Processing times for production programs are diminishing, system idle time is diminishing, and jobs per hour are increasing. And the improved performance has let us accommodate more activity without increasing the total data processing resource."

Among the new applications are online teller transactions. "The first branch went online three months after MVS came up," Haines says, "and we've been on schedule ever since."

"We are processing over 100,000 transactions a day now," Anderson adds. "We expect that to rise to 120,000 when all the branches are online.

"The error recovery facilities of the MVS operating system have been superb," he continues. "It has been very easy to bring the system back up—almost like following a cookbook.

"Now we support online program development under Time Sharing Option (TSO) as well as online transactions. MVS and MP allow us to distribute the power of the 158 to the hands of the people who can make use of it."

Interactive and Data Management Aids from IBM

Three software products available from IBM extend the power of data processing systems:

1. **Virtual Storage Personal Computing** (VSPC) permits problem-solvers at terminals to interact with the computer in user-oriented languages.

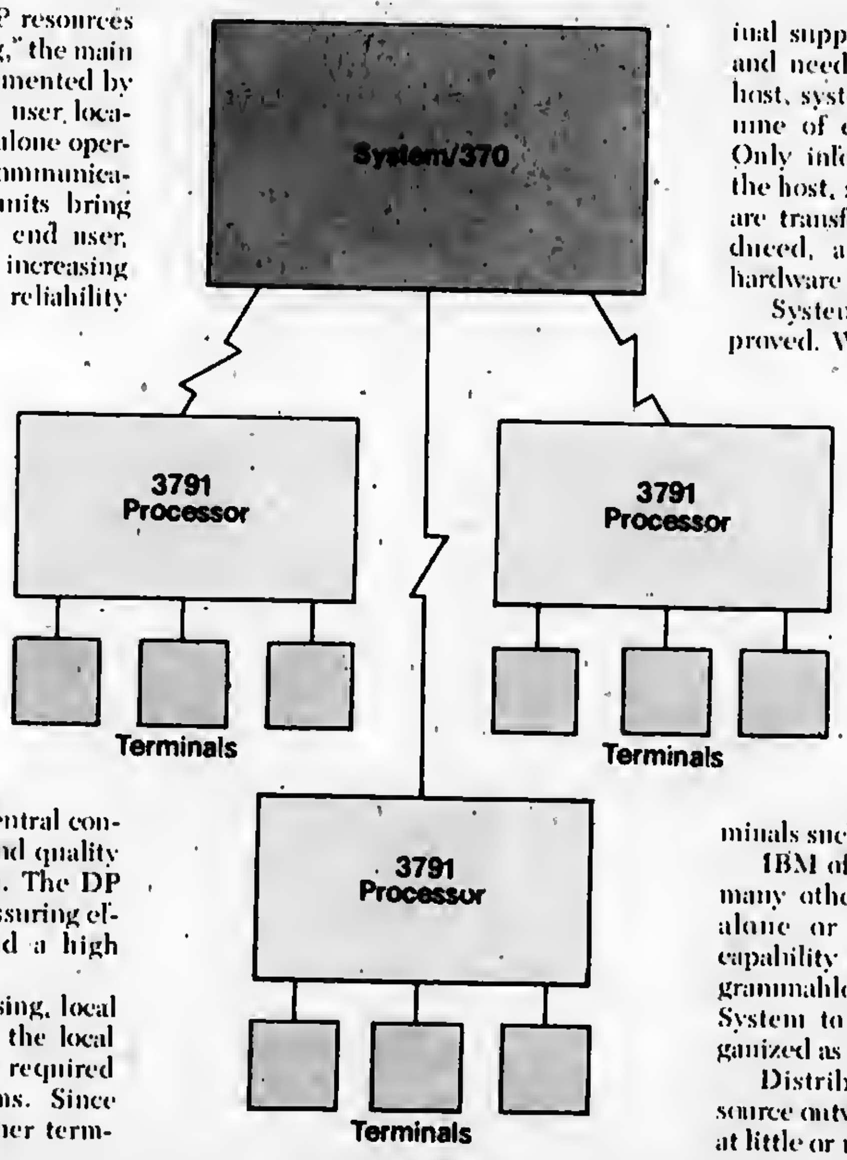
2. **Generalized Information System** (**GIS**) provides facilities for creating and maintaining formatted files and for extracting data from them, particularly where information needs are spontaneous and varying.

3. **DB/DC Data Dictionary** supports data-base management, aiding the consistent and nonredundant definition of data and the establishment and administration of data standards.

For more information on these and other IBM software products, contact your local IBM branch office or write to the Editor of DP Dialogue at the address below.

Distributing DP Resources Improves User Service

In the organization of DP resources called "distributed processing," the main or "host" computer is supplemented by smaller machines in selected user locations. Capable both of stand-alone operation and of terminal-like communication with the host, these units bring computing capability to the end user, simplifying the system while increasing its responsiveness, flexibility, reliability and availability.



The IBM 3790 Communication System extends distributed processing by preserving the benefits of the large-scale computer and protects investments in existing programs. Local processors have access to the central data base, and the full power of the large computer remains available when required. 3790 distributed processors can be programmed from the host computer, maintaining central control over program standards and quality and over the integrity of data. The DP staff can remain centralized, assuring efficient use of personnel and a high caliber of professionalism.

In 3790 distributed processing, local transactions are completed in the local processor, which stores the required data and application programs. Since screen display formats and other terminal support material are stored locally and need not be transmitted from the host, system response time and the volume of communication are reduced. Only information actually required by the host, such as transaction summaries, are transferred to it. Line costs are reduced, and the total cost of system hardware will increase little, if at all.

System reliability may also be improved. When the host computer is unavailable, the local processor can continue responding to requests for service, storing transaction data until the host is ready to receive it. If a single local processor is unavailable, the impact is limited.

The 3791 Controller brings transaction-oriented processing to remote sites, with each controller supporting one or a cluster of online terminals such as the 3277 Display Station.

IBM offers distributed processing in many other forms, which place standalone or communications-oriented capability at remote sites, from a programmable 3770 Data Communication System to System/370 installations organized as satellite processors.

Distributing some of the DP resource outward can improve user service at little or no increase in cost.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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We develop and market system and application software packages. Like the other UCC Divisions, we're committed to the introduction of at least one major new product every year. That's one reason why we've maintained an annual growth rate of 40%. Another reason is that our products perform – our users' ratings have consistently won industry honors for UCC software. It's no wonder that, of the last seven packages we introduced, four are the #1 sellers in their category. Today, over half of all OS installations use UCC software. I'm looking for the kind of people who can help us accelerate that pace.

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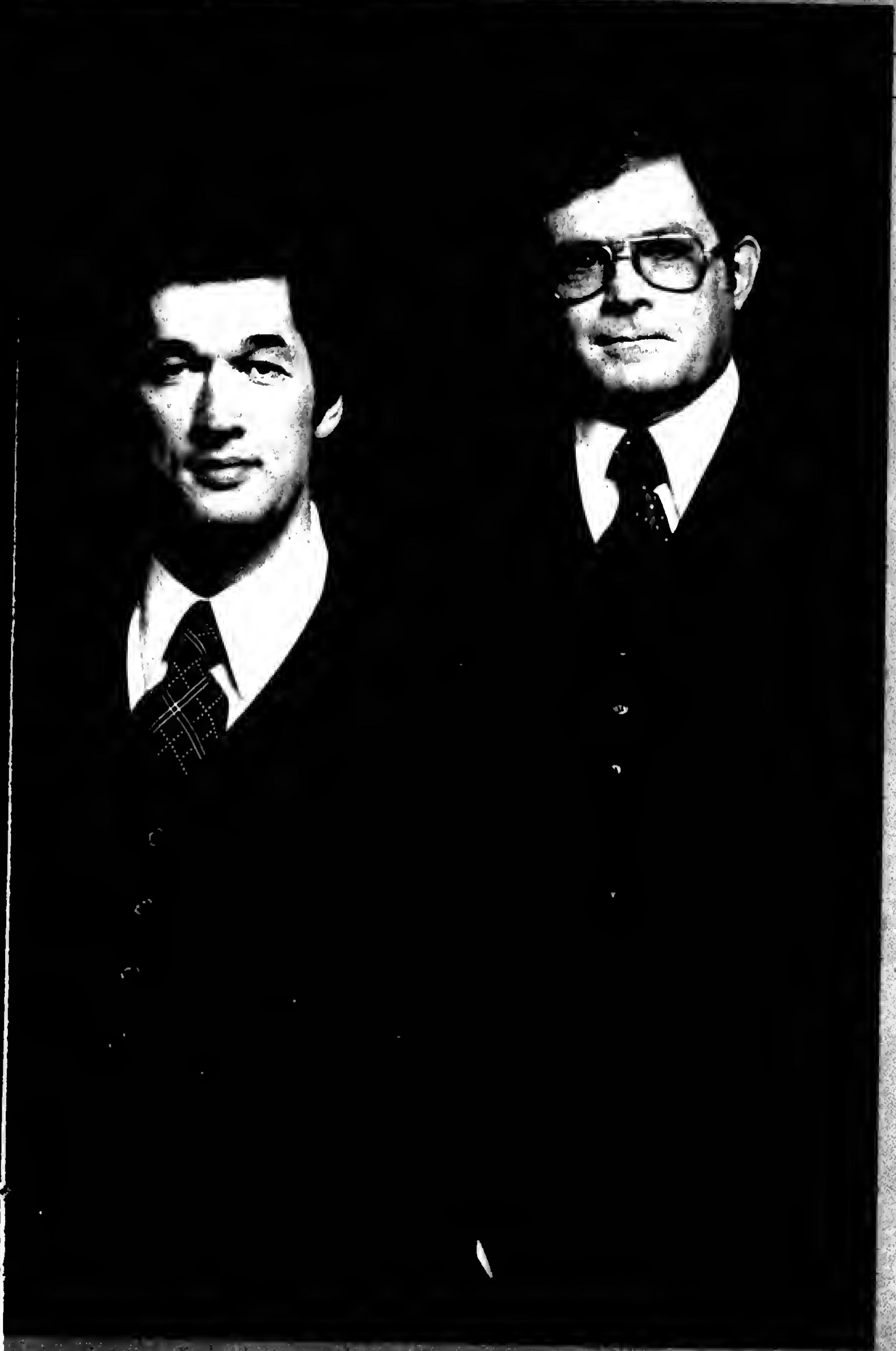

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Of the 5,000 customers served by UCC daily, 700 of them are financial institutions. We're the Banking Division and we specialize in financial application software and computing services for the commercial banking and thrift industries. We must do a pretty good job of it, too, since 2 out of every 3 banks in the Top 100 use UCC software. In our area, the future is spelled EFT... and we're ready for it. All in all, our staff probably represents a concentration of capabilities that is exceeded by only a few of the world's largest financial institutions. In short, they are some of the best and I'm looking for more people just like them.

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Reply in confidence to Mike Harvey, President, UCC/U.S. Group, P. O. Box 47911, Dallas, Texas 75247.

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Symposium on Basics Slated

NEW YORK — A two-day symposium covering telecommunication concepts, management and systems will be presented here by American Management Associations at its headquarters beginning January 9, 1978.

Using a series of presentations and discussions, the course will attempt to expand the attendee's understanding of telecommunications systems, a spokesman said. It will also cover equipment costs and performance, operating methods, electronic mail systems and the costs and benefits in relation to corporate objectives.

Topics for discussion will include an overview of the telecommunications industry, word processing as a communications tool and the implications of satellite communications, the spokesman added.

Sessions related to telecommunications will also be available from the group. "Managing Telecommunications" will be held on April 17-21 in Washington, D.C., and on May 1-5 in Boston. "Interconnect" will take place on Feb. 6-8 in Houston and March 1-3 in Chicago. "Practical Techniques for the Experienced Telecommunications Manager" will be the session topic on June 6-8 at the association's center in Chicago.

Information concerning any of these courses can be obtained from the American Management Associations at 135 W. 50th St., New York, N.Y.

CA Adds Remote Testing

IRVINE, Calif. — A remote diagnostics capability designed for large-scale, multifunctional computer communications networks was announced today by the Commercial Systems Division of Computer Automation, Inc.

The capability, available at no additional charge to users of Syfa network processing systems, centralizes control of network fault isolation and prescriptive action, according to a spokesman.

The Syfa approach reportedly goes beyond existing concepts of remote service in that it can downline load software from a central location that can then perform diagnostics comparable to that which would be expected from on-site service.

If a malfunction occurs that prohibits downline loading, on-site service is still required. Otherwise, an entire network of remote computer systems could be diagnosed from a central location, the company said.

The capability lets user operations personnel or a field service representative access any Syfa system in a distributed network and execute software that can determine if a fault or failure has occurred in Syfa hardware (CPU or peripherals), Syfa system software, a user-written application program or some aspect of host computer operations, the company said.

Cassette Drive Stores Data At Terminal

RICHMOND, B.C. — A modular cassette tape drive from Epic Data Sales Ltd. here reportedly eliminates the auxiliary peripherals that otherwise might be needed to gather and store data with the company's 1647 series data collection terminals.

This capability suits the self-contained unit to job-costing and inventory applications at remote sites or departments and to tasks like transaction logging and store-and-forward operations, the firm claimed.

The drive reportedly uses industry-standard cassette tape with biphase level recording and meets Ansi, Ecma and ISO standards.

With the cassette option, users can cut line costs and free mainframe time by sending report data to a terminal for subprinting, a company spokesman said.

The standard drive reads and writes at 10 in./sec, rewinds at 80 in./sec and searches at 40 in./sec to 80 in./sec while optional drives read and write at 5- to 40 in./sec and rewind at up to 120 in./sec, the company said.

In OEM quantities, the drive costs $1,485. Epic Data is at 7280 River Road, Richmond, British Columbia, Canada V6X 1X5.

Unit Gives Dial Phone Pushbutton Capability

BOSTON — A microphone replacement that reportedly can convert a dial telephone into a push-button model was introduced by Super-Electronics.

Soft-Touch, a dial and microphone, is said to eliminate the need to change an entire telephone system. After conversion, a dial telephone can be used for data entry or other DP functions.

Soft-Touch is priced at $29.95 from Super-Electronics, P.O. Box 230, 80 Border St., East Boston, Mass. 02128.

Portable Workstation Available From MCS

ANAHEIM, Calif. — A portable terminal workstation has been introduced by Mini-Computer Systems, Inc. (MCS).

The Model 2506 was designed for airline checking gates, shipping/-receiving departments, remote inventory control and other applications. It features an 18 in. wide by 24 in. deep work area provided either on the left or right side of the terminal.

The Model 2506 is priced at $245 from MCS, 2259 Via Burton, Anaheim, Calif. 92806.

"We've made a single sale worth $150,000 right on the exhibit floor. We couldn't be more pleased with the Computer Expo."

[illegible]

"We couldn't be happier . . . there have been so many qualified prospects at this year's Expo that it will pay for itself many times over. We have already invoiced sales made at the first cities we visited. Needless to say, I want to be the first to sign my Exhibit Agreement for the 1978 Computer Expo."

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President
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Terminal Rental
Applied Data Communications
Data Forms Company
Imperial Technology
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Computer Corp. of America
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Cullinane
Hewlett Packard
Pansophic Systems
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Data Systems Specialists
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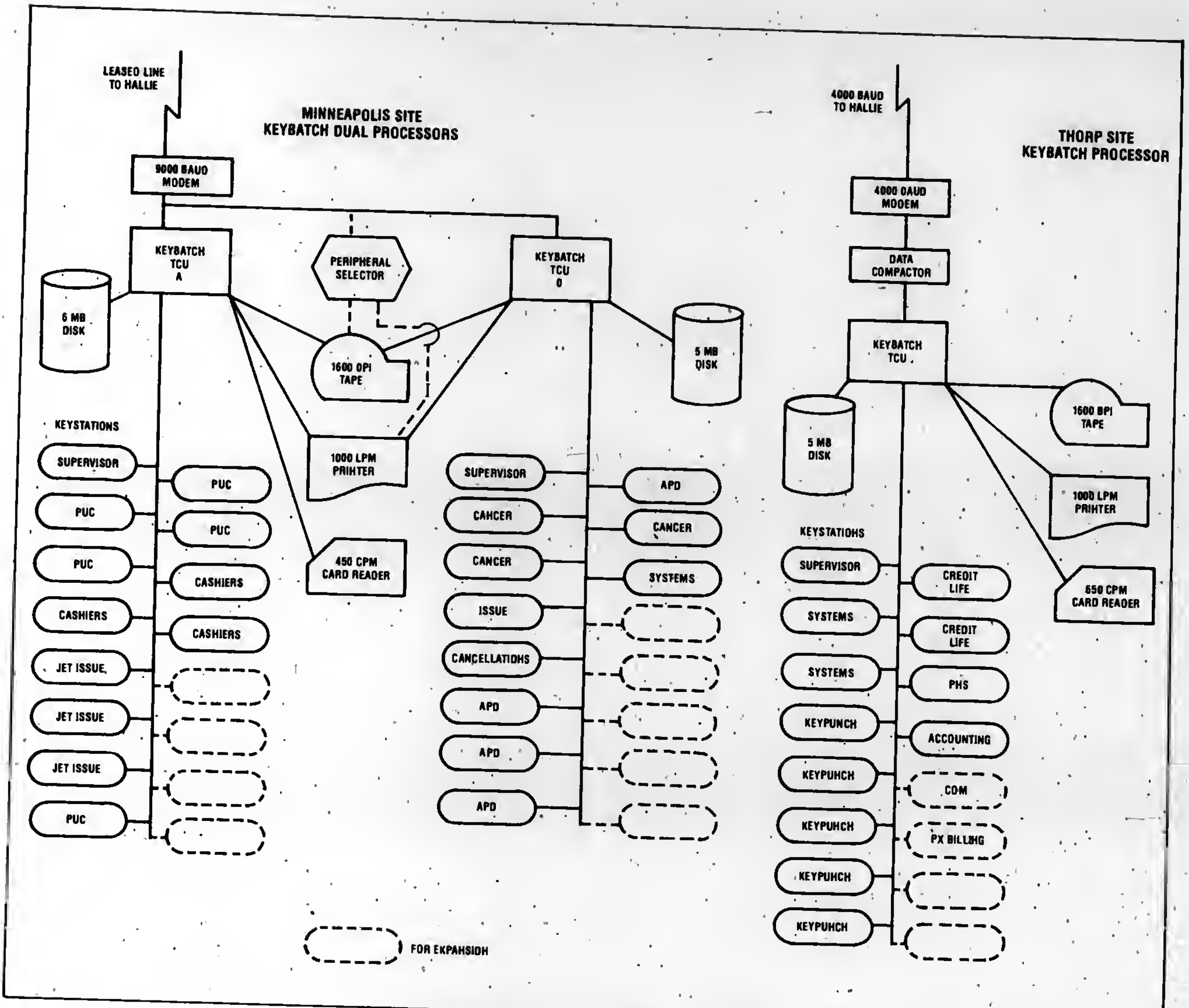


ITT Life Insurance Corp.'s Data Entry System

With Switch to Key-to-Disk

Data Entry Time Cut 66%, Errors 40%

THORP, Wis. — A life insurance company that switched from punched card data entry to key-to-disk technology has cut its data entry time by more than two-thirds and reduced data entry errors up to 40%, according to the firm.

The ITT Life Insurance Corp. here has some 360,000 policies in force and processes 500 to 700 new policy applications every day, according to James R. Dooley, vice-president and director of information services.

Dooley said ITT Life chose Data 100 Corp. Keybatch system for a number of reasons: "The system provides concurrent data entry and RJE [remote job entry] and had [IBM] Isam capabilities, which we wanted for file accessing.

"Data 100 would also have to maintain the system in our Thorp location — one reason why several vendors dropped out of the selection process. Also, the firm provided delivery in 30 to 45 days," he added.

The system was installed at the company headquarters here late in 1976. A second dual Keybatch system went into the company's offices in Minneapolis.

The current system in Thorpe consists of one Keybatch terminal control unit, a 600 card/min card reader, a 1,600 bit/in. tape drive, a 5M-byte disk unit, a 1,000 line/min printer and eight keystations. The system is connected by a 4,800 bit/sec private line to an IBM 370/145 in Hallie, Wis.

Data 100 data compactors are also used to speed up the data transmission times, which has resulted in increased printing speeds, Dooley said.

Minneapolis Division

The Minneapolis division has dual Keybatch control units; a 1,000 line/min printer; a 1,600 bit/in. tape drive; a 450 card/min reader; two 5M-byte disk drives with a selector switch to enable communications switching; a tape drive and printer between the two processors; and 20 keystations. That system is connected by a 9,600 bit/sec leased line to the CPU in Hallie.

At the time ITT Life converted to Keybatch, the company's new business coders were trained and upgraded to data entry operators. "Conversion was very easy," Dooley said, "because the system is almost self-explanatory. It asks for the data, eliminating errors formerly caused by coders

(Continued on Page 42)

Firm Meets Clients' Deadlines With 'Distributed Keypunching'

By Tim Scannell
CW Staff

ROANOKE, Va. — The owner of a contract keypunching firm here manages to meet his customer's deadlines by utilizing the talents of people working at their own homes.

Ben C. Payne, president of Data Entry Services, has installed reconditioned keypunch machines in the homes of various employees. Work is delivered to these employees, usually by Payne in his Volkswagen, and then picked up when it is completed. At present, Payne employs 13.

All of the keypunches, IBM 024 and Verapower machines, are at least 25 years old. At first, maintenance of the machines was a problem because technicians refused to make the "house calls" necessary to examine the units for repair.

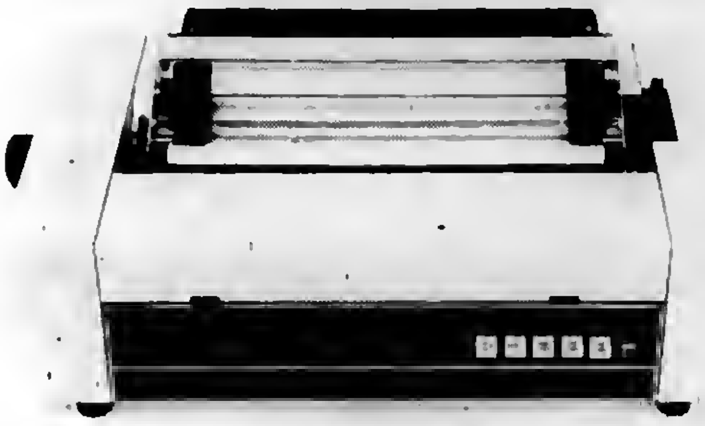
After considerable coaxing by Payne, they were eventually persuaded to furnish their services and supply a maintenance contract that currently costs between $250 and $300 per month.

Since his business is based only 250 miles from Washington, D.C., Payne receives what he termed "a fair amount" of government subcontracting work. One such assignment involved aiding the government in the yearly task of registering aliens.

Payne and his company were responsible for keypunching data off the forms submitted by 300,000 of the more than five million to eight million aliens registering that year,

(Continued on Page 42)

Printers Introduced



Lear Siegler Model 201

ANAHEIM, Calif. — Lear Siegler, Inc. has introduced a line of bidirectional printers that reportedly feature improved throughput and a controlled current regulation circuit.

The 200 series includes the Model 201 matrix printer and the Model 210 receive-only communications teleprinter. They are equipped with a standard 36-pin parallel and RS-232 interface, respectively.

The throughput capacity of each printer is 75 line/min for 132-char. lines; 120 line/min for 80-char. lines/ and more than 900 line/min for 1-char. lines, a spokesman said.

Features include current regulation circuit that delivers only the amount of power required to drive the print head. The print head was designed for demanding operation and has a print life that is reportedly greater than that of solenoid-type heads.

The units also feature a servo carriage drive, a built-in ribbon reinking roller, the ability to print paper stock up to 100 lbs and the ability to print single- or multiple-part forms, the firm said.

The Model 201 sells for $2,895 and the Model 210 is priced at $2,995. Lear Siegler is at 714 N. Brookhurst St., Anaheim, Calif.

Key-to-Disk Cuts Insurer's Errors

(Continued from Page 41)

having to manually interpret each individual field on the manual coding form.

"The high quality of technical support also contributed greatly to the successful conversion effort," he said.

At the Minneapolis office, seven divisions are currently using the system. Three Application Processing Divisions (APD) handle new policy applications.

The largest input volume is generated by the APDs. Data is entered from source documents — the insurance application — through keystations located in each division.

The system prompts the operator as to what fields are needed; each application has a policy form number. The operator signs on the terminal, enters the program to be run and enters the policy form number for a specific application.

The system then asks for the fields ~~needed for that policy~~ form. For example, a cancer indemnity application requires certain fields.

Under the former code sheet and punched card system, it was up to the new business coder to remember what fields were needed for a particular application. If the operator coded this information incorrectly, it went into the system, was rejected by the CPU, manually corrected the next day and resubmitted.

Now errors are caught at time of entry, eliminating the wait, Dooley noted.

Batch Balancing

Another feature contributing to increasing accuracy, according to Dooley, is the dynamic batch balancing feature of the system that ensures all batches are in balance before transmission to the host CPU.

Operators can enter data as it appears on the application form in a left-to-right, top-to-bottom sequence. The data is then reformatted at transmission time, according to the format required by the CPU.

"Under the old system," Dooley recalled, "it took between five and eight minutes to complete a coding form. With Keybatch, the fastest operators are now entering certain applications in 42 seconds."

Operator performance is ascertained through the operator statistics software feature, which keeps track of production, providing a basis for judging both system and personnel efficiency.

The new business application uses Isam software to scan the company's list of agencies to determine commissions for each agency. Isam allows instantaneous access to the desired agency with a single inquiry from the keystation.

The Minneapolis office runs the system three shifts a day, five days a week. At Thorp, the system runs 18 hours a day, six days a week.

In both locations, data is placed on disk for batch transmission to Hallie. Every hour the contents of the disk are saved on tape so that if the system should go down , the most the user department operators would have to reenter would be the previous hour's work. Source documents are retained in the user departments until the tape "save" has been completed.

The dual system in Minneapolis also provides 100% backup for the terminal control units. "We can switch over to the other Keybatch control unit and handle our business for the day, retaining full use of communications, the tape drive and printer," Dooley said.

Besides speeding up the data entry process and cutting down on errors, the systems have helped streamline the company's operation, Dooley said.

The keypunch and verification functions have been eliminated entirely for the New Business Division and fewer people are needed in user departments, he added.

The keypunch data entry process required application processing to be cut off early in the day so that keypunching could be completed in time for the daily transmission of data. Now data is batched and ready for transmission immediately.

Data Entry Course Slated

NEW YORK — A course concentrating on the problems and procedures of data entry management will be held at the headquarters of American Management Associations (AMA) here Feb. 27 to March 2.

Registration fees will be $540 for AMA members and $620 for nonmembers.

Team discounts are available for three or more people from one firm.

The AMA is at 135 W. 50th St., New York, N.Y. 10020.

Keypunch Jobs Distributed

(Continued from Page 41)

he recalled.

Some of Payne's employees have been working at home for Data Entry Services for over 12 years. Carolyn Wilson, who heard about the service from a friend who already had a machine installed in her home, decided to try it herself because of family responsibilities.

"At that time ,my baby was very small and I wanted to be at home, yet I liked the idea of having money of my own," she said.

The people employed by Payne, realize the work is not steady and depends on the number of contracts Data Entry Services gets. Most of them, therefore, do not keypunch for a living.

"The type of work we do is contract keypunching and our work is up and down. Sometimes we're real busy, and then we may have 40 hours with nothing to do. Some of the keypunchers go a month without having a thing to do," Payne said.

Seeing that the work is delivered to his employees sometimes involves a great deal of effort and time on Payne's part. One particular Sunday, he had to deliver work to various home keypunching sites that were spread out over a 100-mile radius; it took four hours of driving time in order to meet a Monday morning deadline.

Some employees have given Payne the key to their back doors to make it easier for him to leave work with them. "This is okay, but you have to have an understanding wife who realizes just what your business involves," Payne said.

Most of Payne's workers are classified as employees, but some are listed as independent contractors because of tax purposes and the sometimes limited amount of work.

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Harris Configures Five Newspaper Systems

MELBOURNE, Fla. — Harris Corp. has introduced five copy-processing systems designed to provide DP capabilities in the editorial, classified, display and business departments of smaller newspapers.

The Model 2531 is suited for newspapers in the 20,000 daily circulation range which produce in excess of 100 pages per week, Harris said.

It consists principally of a system controller with 128K bytes of main memory, the HNS/2 operating system software, four Harris 1720 editorial terminals, interfaces to support optical character recognition (OCR), high- and low-speed wire lines, on-line typesetting and on-line Harris Microstor and 2200 systems, as well as two 66M-byte duplicate-recording disk drives.

Up to 28 Terminals

The Model 2531 is reportedly expandable from four to 28 terminals. It also has a console control device for system monitoring and interfaces that include a paper tape reader/punch, a 180 char./sec line printer and multiplexer ports for up to 16 devices.

The Model 2532 is similar to the 2531 except that it supports eight Series 1700 editorial terminals and up to 24 multiplexer ports for extended input and output device attachments.

The Model 2533 includes 12 Series 1700 editorial terminals; through the use of up to four Microstor controllers, an additional 24 reporter terminals can be added. It can also accommodate the Harris 2230 Video Layout System and the Harris Fototronic typesetters.

The Model 2534 includes 16 Series 1700 terminals and can handle up to 16 other I/O devices within its 32-multiplexer port configuration. With the addition of up to four Microstor controllers capable of accommodating six terminals each, this system can be expanded to 40 input and editorial terminals, Harris said.

The Model 2539 is a dual-purpose system. It is basically a business-oriented system but it can also act as a backup for any of the other 2530 family configurations, Harris noted.

With its software, this system can perform general accounting, circulation, distribution, physical inventory, payroll, management analysis and other business DP tasks, the firm said.

All five systems feature dual data base storage devices of 66M bytes each, providing a total of 132M bytes of storage. The 2531, 2532, 2533 and 2534 feature a "spare" processor and cabling which can be switched on-line within a half hour in the event of a main processor power failure, Harris said.

The systems can accommodate the 1720 and 1740 editorial terminals that feature an edit trace function and dual-screen monitoring of wire and staff-written copy, the firm added.

All systems except the 2539 operate under the HNS/2 newspaper software, which provides automatic copy handling, storage, retrieval and control to minimize staff involvement in copy movement and management, the company noted.

A typical Harris system with a console; terminals; two OCR input interfaces; two typesetter interfaces; four on-line wire lines; a line printer and a paper tape reader/punch supported by a 128K controller with two 66M-byte disks and dual recording software; HNS/editorial, wire, display and classified software systems; and complete installation, training, and warranty support is priced at approximately $250,000.

Harris is at 505 Rodes Blvd., Melbourne, Fla. 32935.

Financial Use Of DP Systems Topic of Course

NEW YORK — A course that deals with DP concepts and their integration into financial and accounting systems will be presented by the American Management Associations (AMA) beginning Jan. 18 in San Francisco.

The two-and-a-half-day seminar will analyze and evaluate present systems and introduce methods of implementing new ones, AMA said.

"Developing DP Systems for General Ledger and Financial Statement Preparation" will cover data base design, maintenance, techniques and security as well as the attributes of a well-defined DP financial system, a spokesman added.

Conversion Help

The course will instruct the attendee in the methods of converting from a manual, loosely controlled general ledger system to an "effective, responsive and adaptive" automated system, he said.

The course will be available in three other cities during the coming year. It will be held in New York beginning Jan. 30, in Atlanta on March 27-29, in Chicago beginning April 12 and again in New York June 26-28.

Registration fees for each meeting are $375 for AMA members and $430 for nonmembers. Team discounts are available for groups of three managers who are attending the same meeting; with the discount, it will cost $320 for AMA members and $365 for nonmembers.

Registration materials can be obtained from AMA at 135 W. 50th St., New York, N.Y. 10020.

WANG'S PCS-II

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Wang's PCS-II. The small business computer that makes intelligent terminals obsolete. And introduces a whole new world of Distributed Data Processing.

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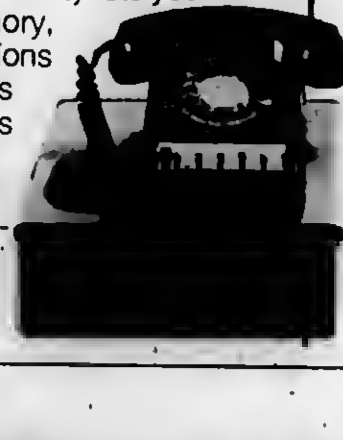

The PCS-II even gives you a price tag no intelligent terminal can match — just $6,200. With 50K memory, dual minidiskette drives and bisynchronous 2780/3780 communications it's still only $9,200.

Hungry for more intelligence? Call your local Wang office or mail this coupon to PCS-II Product Sales, Dept. DDP, Wang Laboratories, Inc., One Industrial Ave., Lowell, Massachusetts 01851.

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Readers Gets Mark Option

MELBOURNE, Fla. — An optical mark reader that is available as a factory-installed option for the DOC 6501 card reader has been introduced by Documation, Inc.

The DOC 6501M, when added to the 6501 reader, can register both punched data and that which is created through black pencil marks, the firm said.

The option will accommodate a mix of punch and optically marked data in any sequential order as well as punched holes and optical marks on the same card.

The 6501M allows mark-sense formats of up to 100 columns and can read a variety of cards by flipping a switch.

The factory installed optical mark reader option is available for $2,400. Documation can be reached through P.O. Box 1240, Melbourne, Fla. 32901.

Burster Handles Eight-Part Forms

PALO ALTO, Calif. — A burster that can separate forms with up to eight carbon-interleaved or carbonless parts was introduced by the Tab Products Co.

The Model 2476 burster can accommodate forms from 2.75 in. in length to 20.5 in. wide and 14.5 in. in length, a spokesman said.

The burster features variable speed which assures that all forms are burst up to 350 ft/min, he added.

The unit also has a jam detector that can automatically stop the machine if a form should fail to enter the stacker properly, he noted.

Features of the burster include tractor pinfeed, slit or wedge see-through top, independent slitter drive mechanisms, an adjustable bursting bar, stacker run out switch, electronic static eliminator and a caster base.

A medial chip remover is available as an option for the 2476. It can extract the 1/4-in.-wide medial chip used to hold continuous tab cards together.

It also removes the perforated trim and stacks the individual cards in sequence, the firm said.

The burster is priced at $3,350 and the optional chip remover sells for $200 from Tab Products, at 2590 Hanover St., Palo Alto, Calif. 94304.

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AMA Course Set On Management Of DP Projects

NEW YORK — A four-day course designed to explore the fundamentals of managing a project from initial organization to final development will be presented by American Management Associations (AMA) in Atlanta beginning Dec. 12.

"Basic Project Management: Planning, Scheduling and Control" will consider, in detail, such aspects of project management as estimating activity span time; organizational conflicts and their resolutions; management obligations; knowing how and when to use a computer; and making effective cost/schedule/performance tradeoffs, AMA said.

The course will present case histories and exercises that will involve the participants with day-to-day applications of project management theory and solutions, it added.

Workshops will also be available in which emphasis will be put on the practice of developing project plans and controls, AMA noted.

The seminars will also be offered in New York and Newport Beach, Calif., Jan. 16-19; in San Francisco beginning on Feb. 6; in Boston March 6-9; and at other locations.

Registration fees for the course are $550 for AMA members and $630 for nonmembers. Team discounts are available to groups of three or more people attending the same meeting at $470 for AMA members and $535 for nonmembers.

Additional information can be obtained from AMA, 135 W. 50th St., New York, N.Y. 10020.

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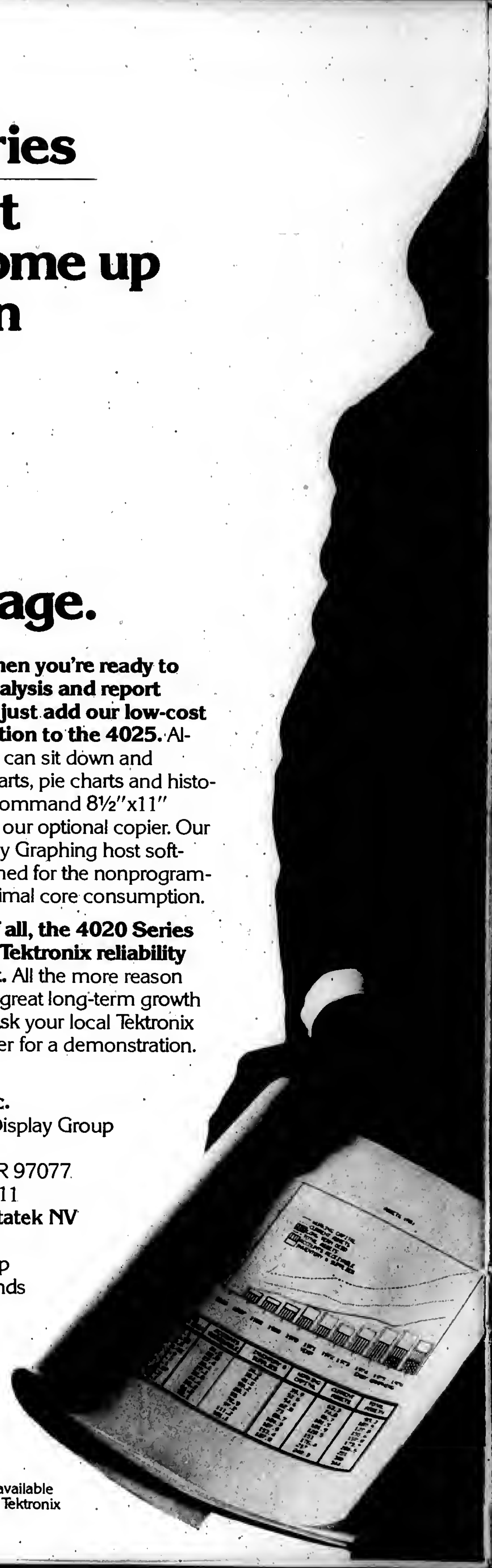

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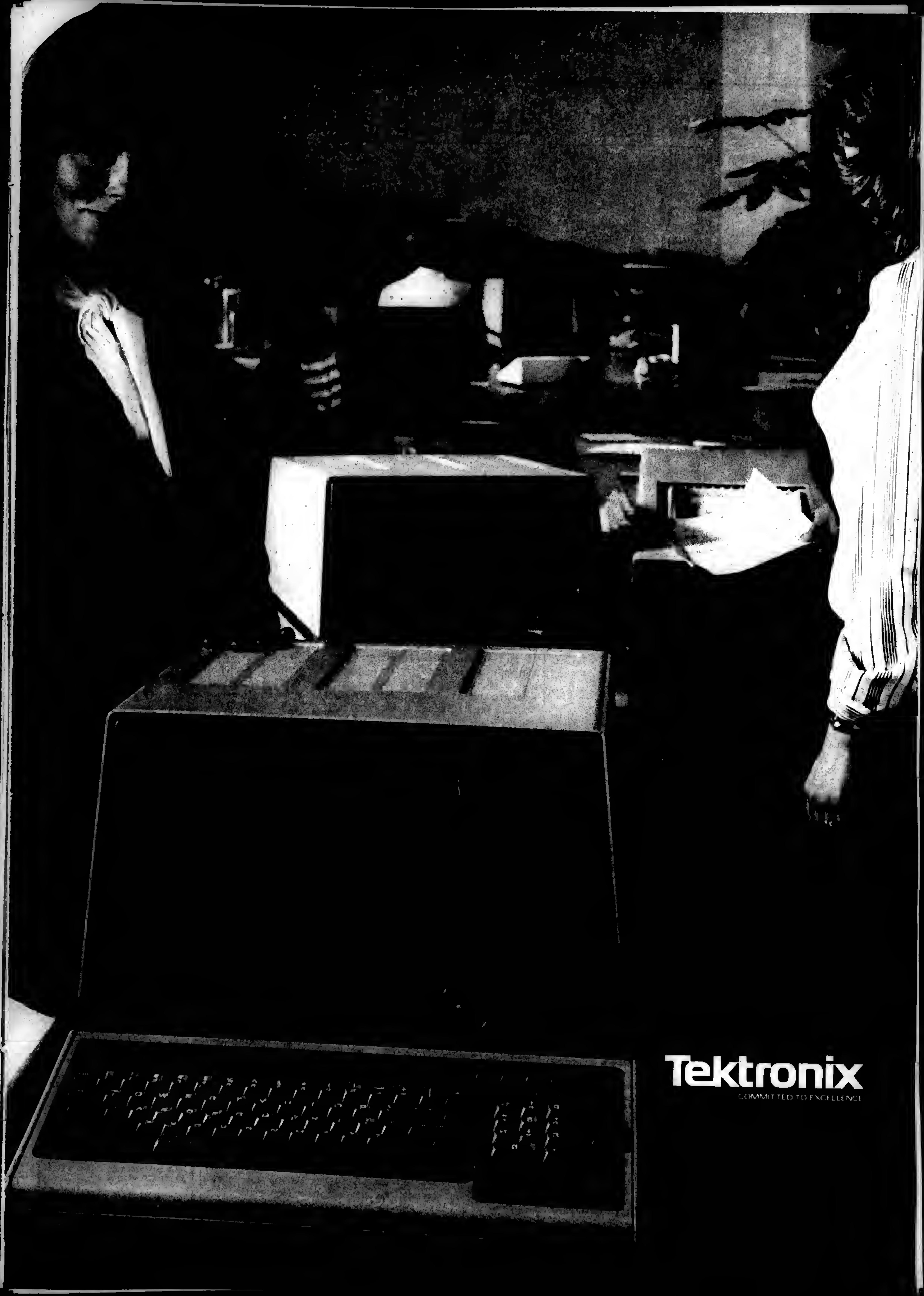
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Bits & Pieces

Texwipe Spray Removes Static

HILLSDALE, N.J. — A nonflammable, noncorrosive, antistatic aerosal spray formulated to remove static charges from the computer environment has been introduced by the Texwipe Co.

Antistat will remove static around data entry and CRT terminals, computers, word processing stations, printers and magnetic tape and disk drives, a spokesman said.

The spray will effectively eliminate static when applied directly to furniture, floors and carpets and around DP equipment, he added.

When used at regular intervals, it reportedly prevents static build-up in the computer environment.

The spray sells for $39.50 per case of 12 from Texwipe in Hillsdale, N.J. 07642.

Paper Tape Reader Features Dual Modes

SAN GABRIEL, Calif. — A paper tape reader that reportedly has the ability to read 5- to 8-level tape and to transmit 7- to 11 frame char. at 50- to 9,600 bit/sec has been announced by Addmaster Corp.

The Model 612 has a transmission rate of up to 150 char./sec, synchronous or asynchronous, and a feature that permits starting and stopping on character at all speeds, according to a spokesman.

The unit also offers a choice of manual control or automatic on/off, 90V to 260V, 50- to 60 Hz power and even, odd or no parity.

The reader, which can accommodate RS-232, current-loop or parallel outputs, ranges in price from $625 to $725, Addmaster said from 416 Junipero Serra Drive, San Gabriel, Calif. 91776.

Analogic Introduces Current-Loop Converter

WAKEFIELD, Mass. — Analogic Corp.'s line of data converters has been expanded by the addition of the MP1480 12-bit current-loop D/A converter.

The device is modular with a built-in storage register. It acts as a digitally controlled current valve for standard or other customer-selectable current ranges or as a voltage output D/A converter, Analogic said.

The MP1480 was specifically designed for application in industrial process control systems.

The MP1480 is priced at $135 for a single unit and at less than $100 in lots of 100, Analog's A/D/A Modular Products Group said from Audubon Road, Wakefield, Mass. 01880.

Talos Has Digitizer For Geophysical Use

SCOTTSDALE, Ariz. — A geophysical digitizing system that can reportedly convert graphical data and information into computer language for data analysis has been announced by Talos Systems, Inc.

The system consists of a Talos digitizer with a 12-button cursor, a data processor, display, software package and an output capability for connecting to tape drives, punches or card punches, a spokesman said.

The digitizer is capable of resolving graphics to a standard .001 in. with accuracies of each point to .005 in.

Software routines include well logging, topographical mapping, point identification, velocity, profiling and scaling.

The Geophysical Digitizing System sells for $16,000 from Talos at 7419 E. Helm Drive, Scottsdale, Ariz. 85260.

Converter Offers High Resolution

PHOENIX — An analog-to-digital converter with a resolution of 1 part in 65,535 (16 binary bits) has been introduced by Phoenix Data, Inc.

The ADC 2000/2100 has an accuracy of about .004% with an approximate .002% linearity, the firm claimed.

With a total power consumption of 500 MW, the analog input circuit reportedly accepts a full-range 8.192V signal with optimum system isolation.

Its design utilizes the excessive approximation technique and CMOS circuitry, a spokesman noted.

The unit, designed for airborne and other critical applications, has a price tag beginning at $725. Phoenix Data is at 3384 E. Osborn Road, Phoenix, Ariz. 85021.

Free Material Offered

The following publications are available to users at no cost:

- A six-page brochure on temperature cycling is available from Larry Benjamin, Ransco Industries, 2221 Statham Blvd., Oxnard, Calif. 93030.
- Datapoint Corp. has published its systems catalog. It is available from the firm's Marketing Communications Department, 9725 Datapoint Drive, San Antonio, Texas 78284.
- A four-page brochure describing the CRT 2000 flatbed plotter photocomposition system is available from Image Graphics, Inc., 1525 Kings Highway, Fairfield, Conn. 06430.
- A data sheet covering the capabilities of the Multimemory/148 processor storage system is available from the Electronic Memories and Magnetics Corp., 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.
- Literature spotlighting its 3300 series disk drives can be ordered from the Okidata Corp., 111 Gaither Drive, Mt. Laurel, N.J. 08054.
- A 12-page publication detailing a series of hybrid integrated circuit data converters is available from Hybrid Systems Corp., Crosby Drive, Bedford, Mass. 01730.
- A user's report documenting applications of the Versatec Co.'s 360/370 output system in computer-aided design, mapping, business reporting and graphics is offered by the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.
- A six-page bulletin on the 5100 series of programmable frequency synthesizers which employ the "direct digital" technique is being offered by the Rockland Systems Corp., 230 W. Nyack Road, W. Nyack, N.Y. 10994.
- A brochure describing two rotary lever switches designed for either conventional mounting or printed circuit board insertion is available from Oak Industries, Inc.'s Switch Division, Crystal Lake, Ill. 60014.
- The complete line of Walton Laboratories' industrial and commercial humidifiers is outlined in a brochure offered by the firm in Moonachie, N.J. 07074.
- A four-page bulletin describing the Series 70 plotter points and other drafting supplies is available from Koh-I-Noor Rapidograph, Inc., 100 N. St., Bloomsbury, N.J. 08804.
- A one-sheet catalog detailing the Patriot low-noise cooling fan is being offered by Rotron, Inc.'s Commercial Products Division, Woodstock, N.Y. 12498.
- A 40-page pocket catalog covering tapes, resins, flexible insulation and tubing, equipment and special services is available from the 3M Co., P.O. Box 33600, St. Paul, Minn. 55133.
- A 16-page catalog of Anritsu communications measuring instruments and their applications is available from Tau-Tron, Inc., 11 Esquire Road, N. Billerica, Mass. 01862.

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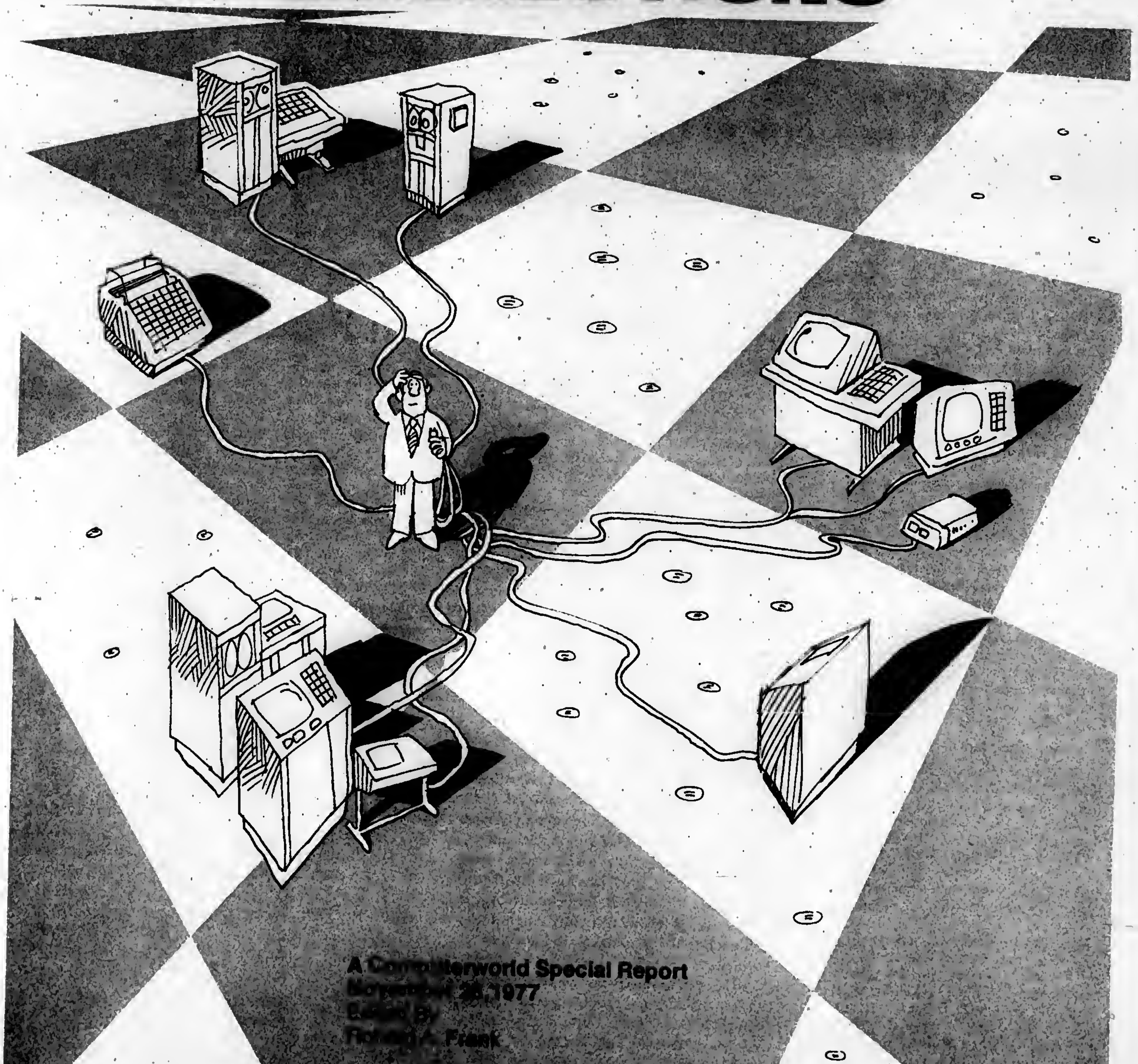

A Computerworld Special Report
November 28, 1977
Edited By
Ronald A. Frank

Standards Complicate Overseas Data Nets

By Ralph Lowry
Special to CW

Just as the international telephone network has made voice communications with virtually all corners of the world almost as simple as a locally dialed call, the same network can provide efficient and reliable data communications services. Leased telephone lines via both satellite and cable span all the oceans and direct dial service is likewise possible between countries and continents.

All that is necessary to convert the voice network into a data communications network is the right modem. A modem, as data communicators know, converts the digital signal of a computer or terminal into an analog signal using the same bandwidth as a normal voice conversation. A modem at the other end of the link than accepts the analog signal and recreates the transmitted digital signal. *Voila* — data communications:

Unfortunately, just as language differences make voice communications between countries difficult, differences in modem standards can make a computer in the U.S. unintelligible to a terminal somewhere in Europe. So there are a few basic facts about modem types which must be understood before undertaking international data communications.

In fact, throughout the world there are two generally accepted standards for modems. The first is really a de facto standard established by AT&T in the U.S., simply because it represents the modem types supplied by AT&T for data communications networks.

Independent U.S. modem manufacturers for the most part make and market compatible or Bell-equivalent devices for the domestic marketplace. This is especially true in low- to medium-speed applications which utilize the dial (DDD) network, since it is desirable to be able to interchange modems to gain the advantages an independent vendor might offer, yet still be able to communicate through Bell devices.

The exception to this situation is in the higher speeds, which were pioneered by independent vendors. Most high-speed applications (4,800 bit/sec and above) are implemented over dedicated (private) facilities so that a user simply orders modems for both ends of his link from a single vendor. In the higher speeds, compatibility is less of an Issue than are the performance characteristics, the diagnostic functions, the optional features and the price differences.

The rest of the world, however, utilizes a different standard. The International Telegraph & Telephone

(Continued on Page S/14)

Bell Type	CCITT Recommendation	Usage	Speed	Line	Modulation	Operation Moda
103/113	V.21	Dial or Leased Line	0-300 bit/sec	2W	FSK	Asynchronous
202	V.23	Dial or Leased Lina	0-1,200 bit/sec	2W/4W	FSK	Asynchronous
201 B	V.26	Leased Line	2,400 bit/sac	4W	PSK	Synchronous
201 C	V.26 bis	Dial or Leased Line	2,400 bit/sec	2W/4W	PSK	Synchronous
206 A	V.27, V.27 bis	Leasad Lina	4,800 bit/sac	4W	DPSK	Synchronous
206 B	V.27 tar	Dial	4,600 bit/sec	2W	DPSK	Synchronous
209	V.29	Leased Lina	9,600 bit/sac	4W	QAM	Synchronous

Table 1. Functionally Equivalent Bell and CCITT Modems

At Wholesaler's Centers

Remote Management Cuts Power Use 10%

By James R. Hiatt
Special to CW

FLORISSANT, Mo. — To cut energy costs and conserve power in its distribution centers, Wetterau Inc., a food wholesaler for an independent voluntary group of supermarkets, recently added a remote power management capability to its data communications network.

The economics of energy conservation require that savings, in the long run, exceed the cost of saving the energy. This rule was a decisive factor in Wetterau's decision to combine power management functions with an existing distribution center terminal network.

By upgrading the existing system with multiport modems, it became possible to operate both the 4,800 bit/sec synchronous data terminals and the new 150 bit/sec asynchronous power control terminals over the same point-to-point dedicated lines. No expensive multiplexing equipment or additional phone lines were required.

With power management, Wetterau, from its DP center here, can monitor and control energy use in the company's remote distribution centers. Energy savings to date at these centers range from 10% to 15%.

Multiport Modems Installed

The original terminal system used an IBM 370/158 CPU and 3705 line controller. Synchronous IBM 3780 terminals at the warehouses communicated with the CPU via leased full-duplex lines and 4,800 bit/sec modems. The terminals handle such functions as inventory management, order invoicing, payrolls and shipping orders.

Hardware for the power management system includes an IBM System 7 processor at the central site and power control terminals at the warehouses. In addition, the 4,800 bit/sec modems used in the original terminal system were replaced by 16 Modem 96 Multi-Modes from Racal-Milgo (ICC).

The 96 Multi-Mode is a 9,600 bit/sec modem capable of single-channel or multiport operation. It can combine and transmit over a single circuit a combination of 2,400, 4,800 and 7,200 bit/sec channels, up to a total of 9,600 bit/sec, each with a simulated independently controlled carrier. A front panel switch allows an operator to select the desired multiport configuration.

Wetterau currently uses both a 4,800 and a 2,400 bit/sec channel on each modem. The IBM terminals operate over the 4,800 bit/sec channel, while the 2,400 bit/sec channel is used to handle asynchronous 150 bit/sec data from the custom-built power control terminals.

The asynchronous 150 bit/sec data

(Continued on Page S/20)

Automated Net Control Reduces Outages

By Ken Coleman
Special to CW

The overall philosophical rationale for justifying, designing, installing and maintaining data networks has usually been associated with increased user productivity. Companies with small networks normally have little problem with this notion; however, larger networks often require a separate function to manage them.

Network management is the overseeing of day-to-day communications activities; the analysis for optimization and/or reconfiguration of a network; and the planning for network migration, consolidation and future installations. In many cases, these functions have grown to the point of justifying a full-time effort into network management.

With the introduction and development of statistical multiplexing, intelligent terminals and sophisticated line protocols, network management has become an important concern for even the user of a small data network. This does not mean that every organization must pay upwards of $200,000 for a well-equipped technical control center. Nor does it mean that networks will become unjustifiable based on cost or unmanageable because of complexity. A look at existing technical control centers tells why.

Much of the justification for technical control centers hinged on two factors: increased user uptime and tighter control on vendors. There is a good possibility that these criteria may have been erroneously appointed.

Taking the second point first, the vendors have gotten more sophisticated and subsequently more intel-

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On the Inside

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Implementation No Problem

Shared Insurance Net Could Reap Big Savings

By Ivan T. Frisch
And by Wen Hsieh
Special to CW

Few people doubt the need for improved two-way terminal-computer communications between a property and casualty insurance company, its field offices and its independant agents. It would seem equally obvious that the concept of many major companies and independent agents sharing costs in an expanded and cooperating network would result in low costs and efficient exchange of information.

When it comes to the question of exactly how much lower such costs would be, however, intuition fails as a tool. For this reason Network Analysis Corp. (NAC) was engaged by the Electronic Processing Implementation Task Force (EPITF) Systems Committee to evaluate the feasibility of a shared communications network in the property and casualty insurance industry and to examine the cost/-performance tradeoffs for various telecommunications strategies and architectures.

To perform these analyses, certain basic reasonable hypotheses were adopted — assumptions that were made with the agreement of EPITF — regarding the number of potential participants in an optimized network and the resulting level of traffic. These were:

Number of companies: 24.

Number of company field offices: 1,000.

Number of cities with field office locations: 50.

Number of independent agents: 10,000.

Number of independent agent locatlons: 350.

Traffic level: 440 kbit/sec peak hour or 20 billion char./mo or 114 transction/agent/day.

These assumptions were not arbitrary guesses on NAC's part. They were derived from discussions with key companies, reviews of previous studies made by both EPITF and its other consulting firm, Stanford Research Institute, and detailed traffic survey questionnaires sent to major companies using independent agents, which account for 80% of the projected traffic.

Further assumptions were: the average agent communicates with six companies; agents are geographically distributed in accordance with general population densities; the 50 field office cities are the 50 largest in the U.S. (Secondary assumptions were made regarding average message sizes, hardware costs, line tariffs, the sizes of representative companies, field offices and agencies, etc. These are not detailed here for sake of brevity, but the specific assumptions are available to interested parties.)

Strategies Posed

From this point we posed and investigated various telecommunications and business strategies. We also investigated scenarios of different levels of agency-company interaction and field office utiliztion. This was done using NAC's interactive computer networking analysis programs, which compared various types of agent-headquarter communications systems.

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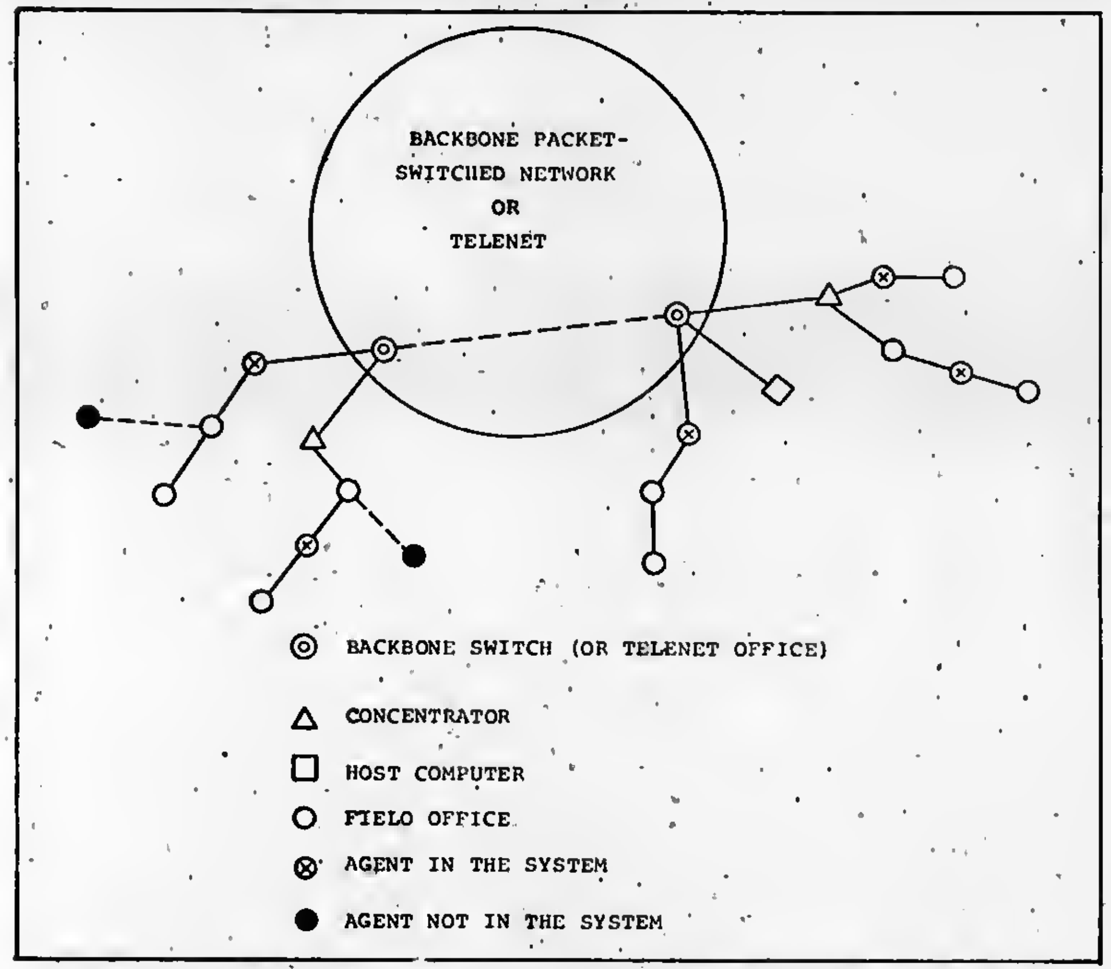
BACKBONE PACKET-SWITCHED NETWORK OR TELENET
◎ BACKBONE SWITCH (OR TELENET OFFICE)
△ CONCENTRATOR
☐ HOST COMPUTER
○ FIELD OFFICE
⊗ AGENT IN THE SYSTEM
● AGENT NOT IN THE SYSTEM

Figure 1. The above represents the total integrated system architecture.

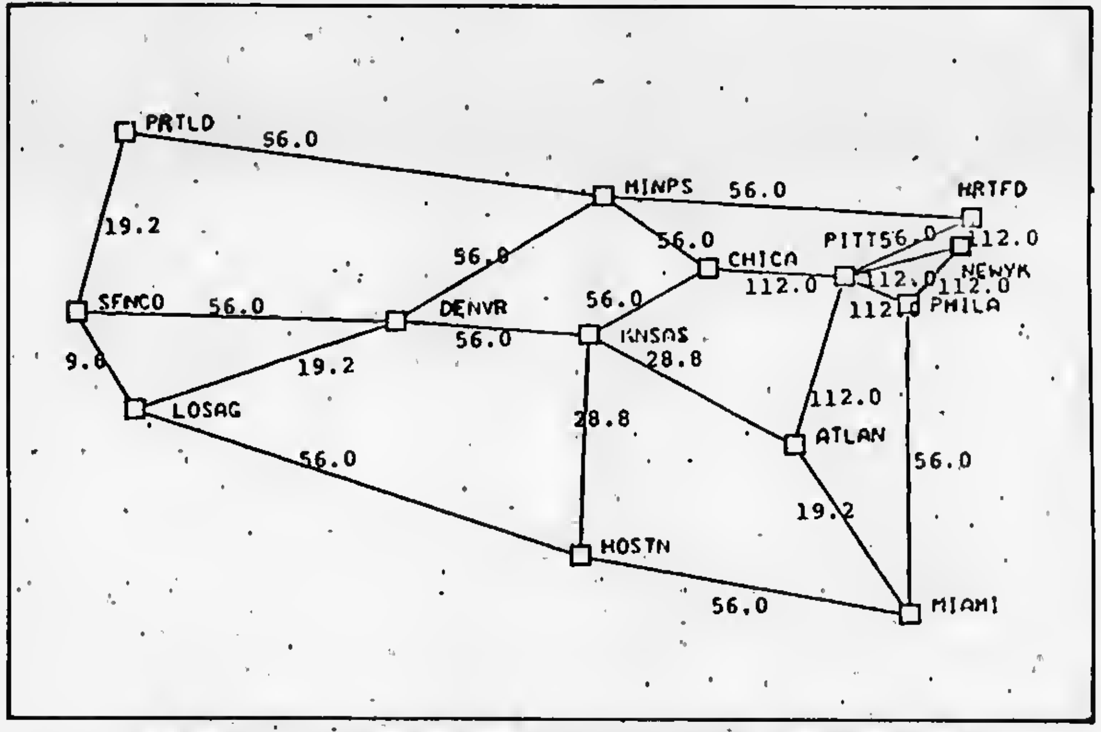

Figure 2. The numerals indicate the link capacities in kbit/sec.

System Characteristics	Design #1	Design #2	Design #3	Design #4	Design #5	Design #6	Design #7
A. Participating Companies	All 24	All 24	Top 5 Excl.	All 24	All 24	All 24	All 24
B. Participating Agents	Top 2,500	Top 2,500	Top 2,500	Top 2,500	None	All 10,000	Top 2,500
C. Terminal Compatibility	Compatible	Not all Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
D. Backbone Network	Private P/S	Private P/S	Private P/S	Private P/S	Private P/S	Private P/S	Telenet
E. Transaction Level (Billions of characters/Mo.)	20	20	11.8	40	20	20	20
F. Number of Terminals in System	4,554	4,554	3,882	5,580	3,000	11,000	4,554
System Cost							
G. Total Communication Cost (G=H+I)($K/Mo.)	822 9	906.9	697.8	992.2	524.4	1658.8	1110.6
H. Backbone Cost ($K/Mo.)	150.5	150.5	112.3	221.6	150.5	172.4	172.0
I. Local Access Cost ($K/Mo.)	672.4	756.4	585.5	770.6	373.9	1486.4	938.6
J. Terminal Cost ($K/Mo.)	1138.5	1138.5	970.5	1395.0	750.0	1700.0	1138.5
K. Total System Cost (K=G+J) ($K/Mo.)	1961.4	2045.3	1668.3	2387.2	1274.4	3358.8	2249.1
L. Communication $/1000 char. (L=G/E)	.041	.045	.059	.025	.026	.083	.056
M. Total $/1000 char. (M=K/E)	.098	.102	.141	.060	.064	.168	.112

Table 1. The above chart summarizes the integrated system designs.

Use Statistical Techniques

Intelligent TDMs Boost Network Utilization

By John M. O'Neil
Special to CW

Thanks to the relatively mature state of the microprocessing art, a new generation of time division multiplexers (TDMs) has evolved. These are generally classed as intelligent TDMs and their most immediate attraction is the significant improvements in network utilization they offer. The intelligent TDM provides to the network the efficiencies of a concentrator, while maintaining the network transparency of a hard-wired TDM in a cost range just above that of the hard-wired TDM.

The intelligent TDMs accomplish greater network efficiencies by taking advantage of network utilization statistics. If we regard a "circuit" as the path between a terminal and a CPU port, we can view its usage from three different levels:

- The statistics of circuit usage. This defines the dimensions of the periods of complete connection between a terminal and its CPU port. These vary, from the occasional-use terminal, such as in time-sharing applications, to the full-period dedicated terminal.
- The statistics of data activity. This describes the periodicity of data transmissions on a connected circuit. Keyboard entry represents the low end of the data activity range and the high end includes devices that transmit data continuously without interruption, as in the case of the high-speed aggregate output of the TDM itself.
- The statistics of language usage. These are based on the usage frequency of individual characters within a character set. Morse code, for instance, has a set of 50 characters (26 letters, 10 numbers, 14 punctuation marks and operational characters).

The length of each coded character is inversely proportional to its frequency of use in English language text, such that the code symbols for the letters E and T have one signalling element, whereas the code symbols for punctuation marks have six signalling elements.

Three multiplexing techniques are used in intelligent TDMs, relating directly to the three levels of usage. Each has its own characteristic advantages and disadvantages.

Adaptive Multiplexing

Adaptive multiplexing, or bandwidth contention, takes advantage of the statistics of circuit usage. This technique provides a multiplexed channel on a demand basis for each individual circuit. The multiplex channel exists on an end-to-end basis only when the terminal-to-computer circuit is active. Otherwise, that portion of the composite data stream it occupies when active is available for other circuits.

The end-to-end multiplex channel is provided on the basis of control signal indications (most generally EIA RS-232C controls) or on the basis of specific "channel request" data characters. The outstanding characterisitic of adaptive multiplexing is that the multiplex channel is dedicated to the terminal-to-computer circuit during the period of its activity and that activity on other circuits through the multiplexed path will in no way delay or disturb it.

Adaptive multiplexing is therefore a nonblocking mode of transmission. Because the channel is dedicated and since there is no data manipulation, the adaptive multiplexer is completely code-transparent and can transmit all the standard code sets and also random data patterns such as those of the National Bureau of Standards encryption system.

Propagation delays in adaptive multiplexing are relatively short, in the range of hard-wired TDMs, and the delay is fixed so that the data transmission does not take on a "bursty" characteristic. The proportion of the high-speed data stream occupied by the channel when active is also fixed and is either equal to (for synchronous channels) or less than (for asynchronous channels) the data rate of the circuit.

During periods of peak traffic, active circuits may occupy all of the available high-speed data "bandwidth." Other circuits which request a channel are either put in a camp-on queue, busied-out or not answered, depending on network application.

Statistical Multiplexing

Although all three multiplexing techniques used by intelligent TDMs are statistical in nature, the term "statistical multiplexing" has come to mean the technique that operates on the statistics of data activity.

On a typical active circuit, there are periods when no data is being transmitted, such as between keystrokes in a manual entry circuit or between ACK/NAK transmissions on the return path of a bisynchronous circuit.

In statistical multiplexing, only active data is transmitted. This data is formed into packets, together with channel address information and error-protection coding. The packet length is variable from system to system and is very much applications-oriented.

For instance, where propagation delay is important, the packets are kept relatively short, perhaps 32 characters or bytes. There is also the requirement to transmit "short packets," such as the last few characters of a typed line. The intelligent TDM must therefore monitor all data transmissions in search of packet-terminating characters.

Statistical multiplexers are transparent to the standard code sets but their use is limited in random-pattern transmissions since packet terminating characters are generally unidentifiable.

Since the packets consist of channel-addressing information and error-protection coding as well as data, the proportion of the available high-speed aggregate data stream occupied is somewhat greater than the circuit data rate, with the actual proportion determined by packet length.

Propagation delay in statistical multiplexers is greater than that of adaptive multiplexers. It is at least as long as the packet length. However, as traffic activity approaches its peak, the delays become longer and variable since the packets from many channels must contend for "space" on the high-speed aggregate data stream. During the high activity periods, the data transmission becomes very "bursty" because of uneven propagation delays.

(Continued on Page S/28)

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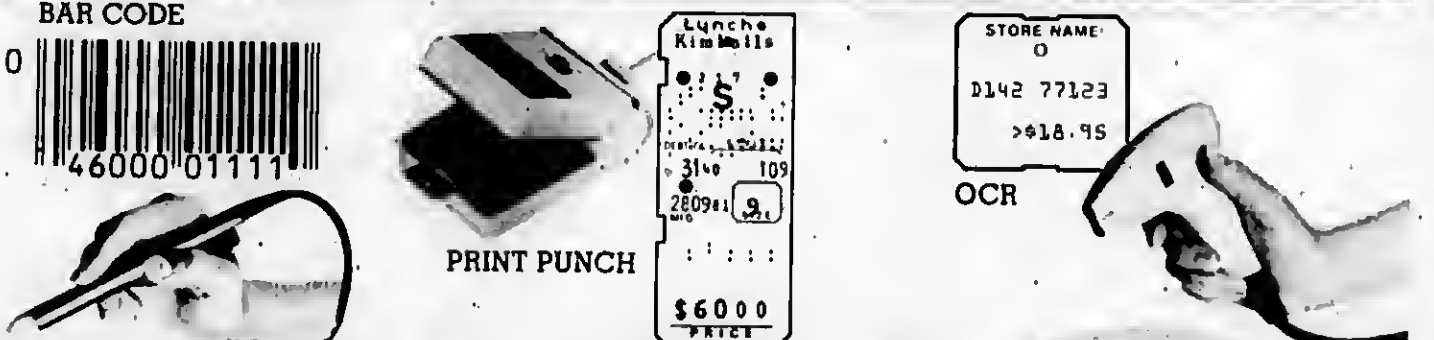

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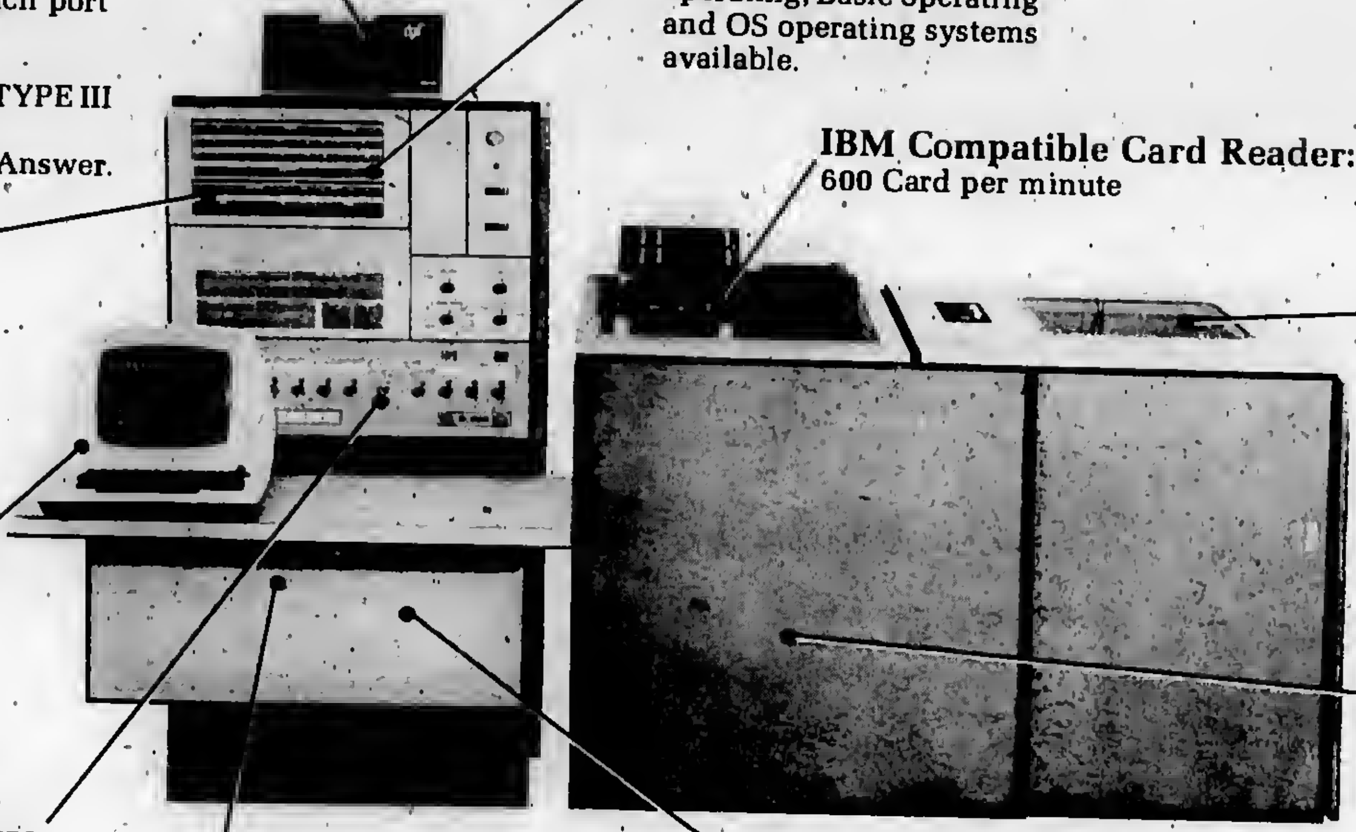

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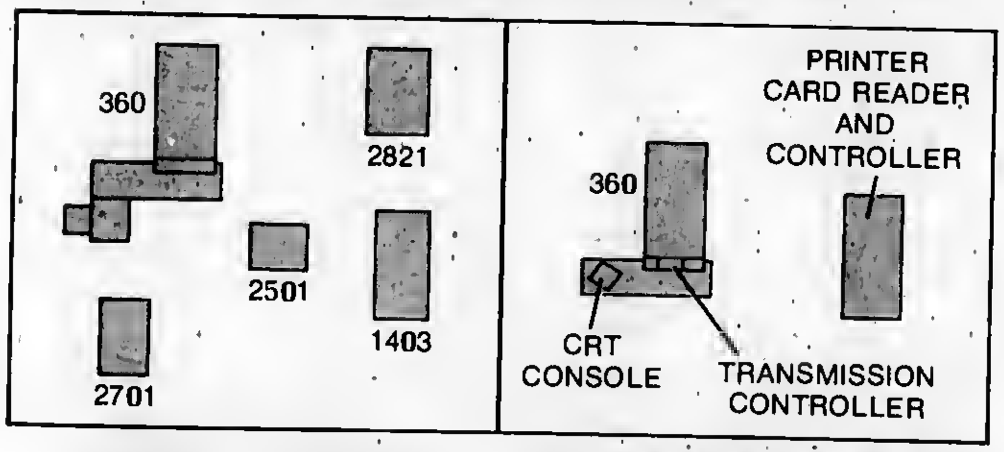

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Distributed DP Can Upgrade Centralized Nets

By Anthony J. Alcorn
Special to CW

Nework analysts and managers are eyeing distributed processing concepts as a means of upgrading or adding new applications to their systems. The problem is that to upgrade existing centralized networks, many of these concepts require extensive systems redesign involving uncertain cost and high risk.

There is, however, a class of distributed processing functions that blends naturally and inexpensively into most existing transaction-oriented teleprocessing systems. Two functions in this class are Local (to the terminal) Format Storage (LFS) and Queued (at the terminal) Transaction Handling (QTH).

These functions remove formats from line traffic (as much as 80% of the total traffic) and keep remote terminal operations productive when the "host" or the communication lines are down. Beyond these advantages, LFS and QTH save money, improve performance and provide a solid platform for future implementation of other distributed processing concepts.

Typical centralized teleprocessing systems used in high production, transaction-oriented applications consist of three major elements: the host CPU, a network of telephone lines (nominally operating at 1,200 bit/sec to 4,800 bit/sec/ and remote terminals capable of network protocol and keystroke/display processing. Such systems typically have data format messages transmitted from the host to the remote terminals and transaction data, entered at the terminals, being transmitted to the host. There may also be considerable print traffic.

The advantage of LFS and QTH is that some gross design inefficiencies built into most of these systems are corrected without redesigning and rebuilding the system.

LFS aids in unclogging the network lines. Transmitting screen formats containing no useful information wastes up to 80% of the network line capacity. Using LFS most of this waste is eliminated by replacing lengthy format messages with short format identification messages and storing the formats themselves at the remote terminal. Typically a reduction of 1,000 characters to 30 characters per message is realized.

QTH, on the other hand, in addition to freeing the CPU for more productive work, provides flexibility and the much needed backup when the network lines or the host have a failure.

Growing Pains

Many networks installed in the past are now experiencing excessive loading and demands for higher performance by the users. An example is a large manufacturing company whose data network is reaching saturation on a daily basis and is causing complaints about the system response time.

The company runs a nationwide system with about 300 terminals interfacing over 2,400 bit/sec lines to an IBM 370/168. A brief data traffic analysis showed that an average transaction involves transmitting a 600-character format to the terminal and returning a 250-character message to the host.

The DP manager has three choices: upgrade most 2,400 bit/sec lines to 4,800 bit/sec, use additional multidrop lines or use an LFS system. The three options were compared using a multidrop line performance prediction program.

After verifying the accuracy of the prediction tool, by comparing predicted vs. actual performance for the present sytsem, the performance for each option was determined and plotted as shown in Figure 1. These curves show that LFS provides superior performance. Equally important, however, LFS is the least costly to implement. In fact, the presently leased terminals can be replaced with terminals having LFS at little or no extra cost. The only other cost would be a two man-month effort to reorganize the host format files — a fraction of the cost of upgrading to 4,800 bit/sec or adding new multidrop lines.

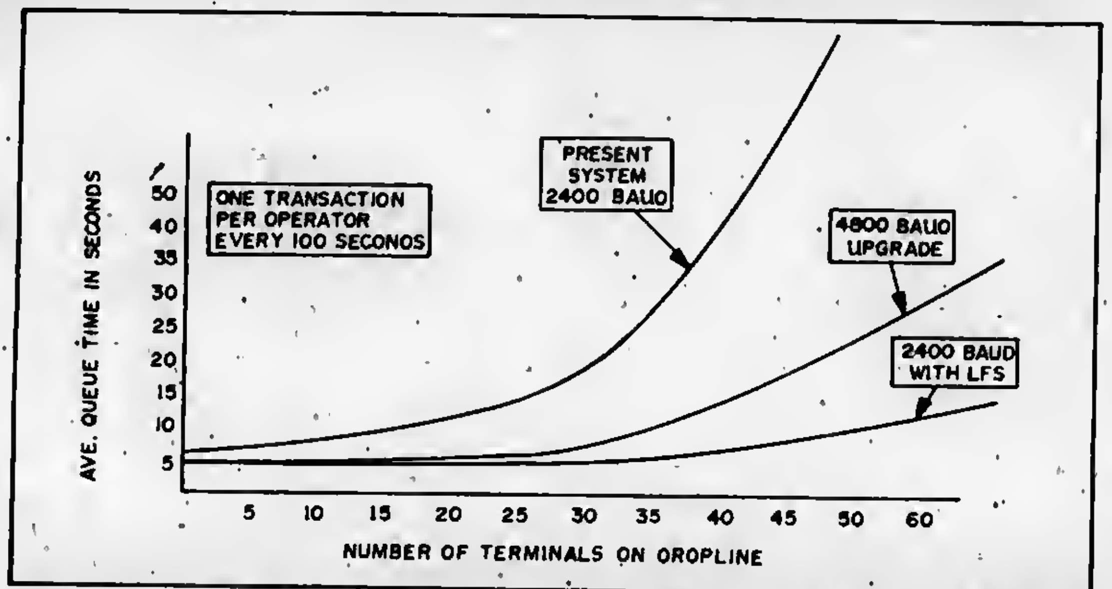

Figure 1. Shown here is a comparison of performance of three options to expand network capacity.

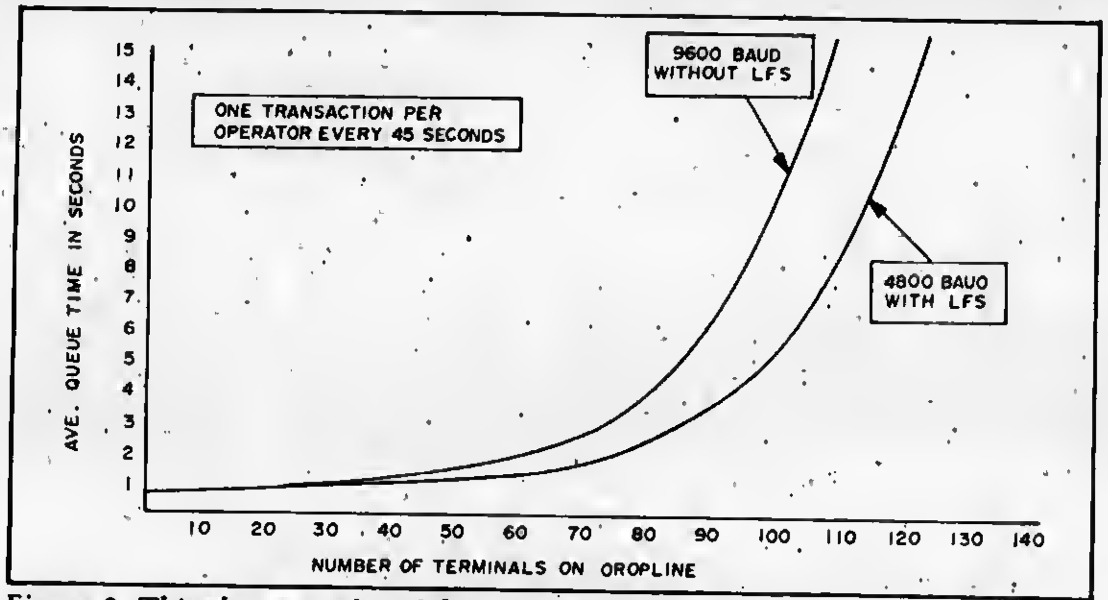

Figure 2. This shows predicted dropline performance at 9,600 bit/sec (referred to here as baud) without LFS and 4,800 bit/sec with LFS.

A more dramatic example of network cost savings achieved with LFS is an ongoing network design in which 1,000 terminals distributed nationwide are to be interfaced to twin 370/168s. The application is presently handled on a remote job entry basis with decision makers preparing source documents and key-to-tape operators keying in the data for batch transmission to the 370/168. In moving from a batch to a real-time system, the data entry operators will be replaced by the higher paid decision makers, placing tough requirements on performance.

The initial design, which met the specified performance requirements, interfaced conventional terminals over 9,600 bit/sec multidrop lines to regional concentrators and then on 19.2 kbit/sec lines to the host. Using LFS, formats are stored at the remote sites, with the result that the average message length on th network drops from 425 characters to 180 characters.

More important, this allows the required performance to be met with 4,800 bit/sec instead of 9,600 bit/sec multidrop lines as shown in Figure 2. This reduction in line speed translates to a 30% reduction in network costs (over $250,000 per year for the proposed system).

Flexibility and Backup

A significant aspect of QTH is its use as a much needed backup during periods of host or network line failure. Under such conditions, QTH allows operators to enter data into storage media local to the terminal. Such transaction files are then transmitted to the host when the host and/or network resume operations.

The flexibility of QTH allows remote terminal operators to interact with the host on-line or to interact locally with the terminal off-line. This significantly improves operational efficiency.

For example, a telecommunications manager may have a network supporting applications having different priorities such as critical real-time inquiry/response, less time-sensitive data entry and administrative mes-

(Continued on Page S/29)

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For Lower Connect Costs

Public Packet Net Services Expanding Overseas

By Robert B. Field
Special to CW

The year 1977 has seen the rapid expansion of public packet network services from the continental U.S. to overseas. Nearly 20 major international locations are now served by packet network services offered by the foreign postal, telephone and telegraph (PTT) authorities in conjunction with the U.S. international record carriers (IRCs) and the domestic packet network carriers Tymnet, Inc. and Telenet Communications Corp.

Packet network services provide inexpensive, highly reliable connections between users' terminals and computers interfaced to the networks. Typical uses include virtually all applications of interactive time-sharing and data base access.

At present, services have been announced for 110- to 300 bit/sec terminals and costs for typical users vary from about $7 to $42 per terminal connect hour. The countries with the higher charges generally include toll-free dialing from all major cities within that country

In addition, some administrations charge a minimum connect fee, a subscription fee and a flat monthly charge for each user name.

In the past, data communications from international locations was, at best, an expensive proposition. Terminal users placing overseas calls paid approximately $200 per terminal hour to access U.S. computers. In many locations, calls had to be placed up to a day ahead of time.

Noisy circuits were also prevalent. The only alternative was to buy a voice circuit and install customer-oriented and operated modems, multiplexers or concentrators. The direct costs generally ran between $10,000 and $18,000 per month and made this impractical for any but the largest users.

History of Expansion

Initial international expansion actually started in 1976 when Tymnet signed agreements for connection to neighboring countries with the Transcanada Telephone System (TCTS) in Ottawa and CONACYT in Mexico City. TCTS now has two Tymnet nodes providing terminal access (Tymsats) in Edmonton and Toronto. These connect to DataRoute service and link Calgary, Vancouver, Ottawa and Montreal to the network.

CONACYT, the Mexican government's science and technology organization, has a Tymsat in Mexico City, with plans to expand to Monterrey this December. In addition, it has several computers connected to Tymnet in Mexico City.

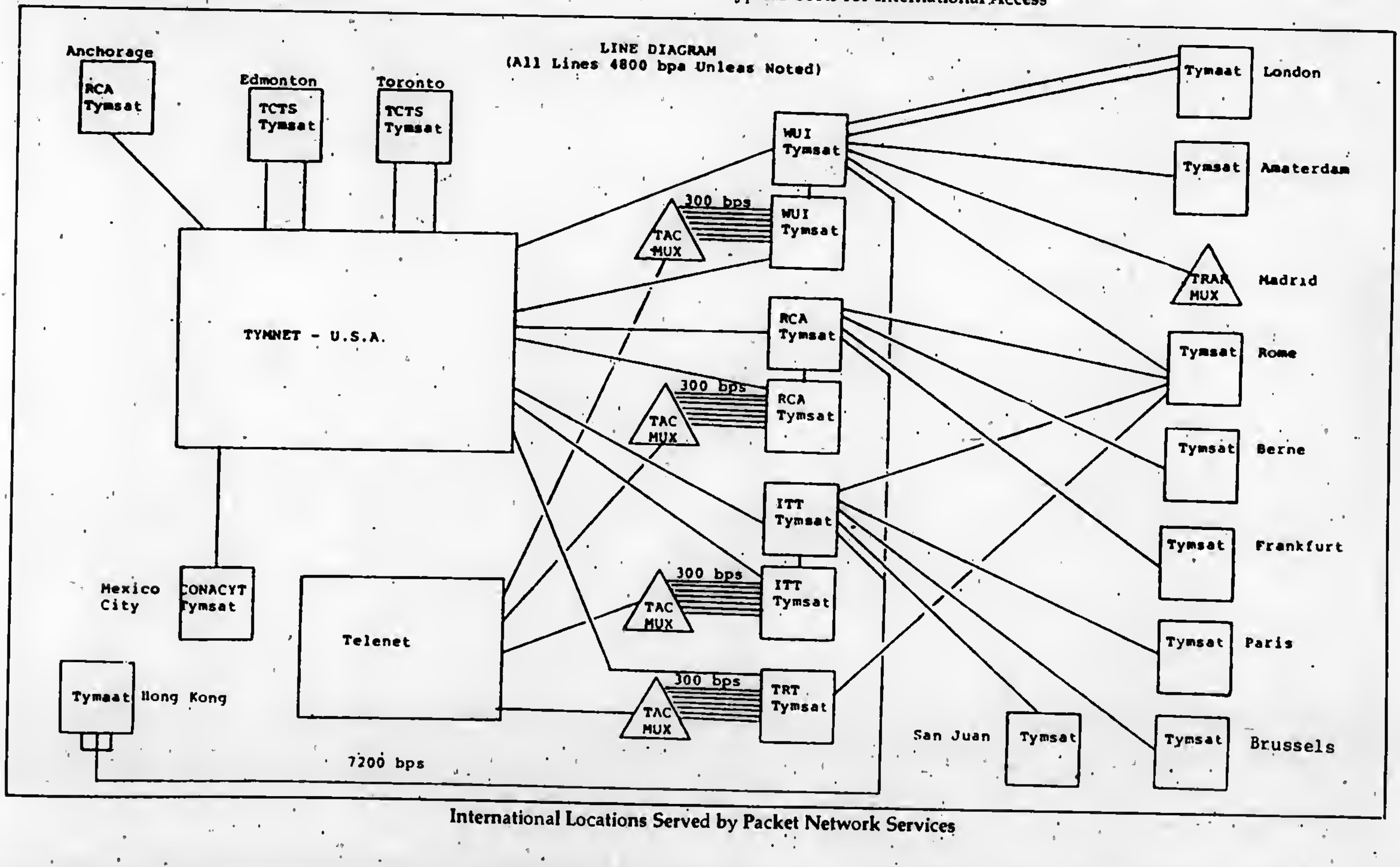
Intercontinental expansion started in February 1977, when Western Union International (WUI) and the British Post Office (BPO) agreed to install a Tymsat in London and connect to a WUI node provided by Tymnet in New York City. From the beginning, usage from the UK to the U.S. host computers has exceeded expectations.

In April, the French Postal Telephone and Telegraph and ITT World Communications, Inc. installed a Tymsat in Paris, France. In addition, a Tymsat was installed in San Juan, Puerto Rico. These nodes were interconnected to another Tymnet-provided node at ITT Worldcom in New York City.

(Continued on Page S/32)

Node Location	Local Access	IRC Agency	Equipment	Approximate Hourly Cost 30 Char./Sec Terminal
London	London	WUI	TYMSAT CP30R	$22.56
Paris	France	ITT	TYMSAT CP64R	$19.72
Berne	Switzerland	RCA	TYMSAT CP64R	$35.23
Madrid	Madrid	WUI	TRAN MULTIPLEXER	$20.80
Brussels	Brussels	ITT	TYMSAT CP64R	$27.85
Amsterdam	Amsterdam	WUI	TYMSAT CP64R	$19.72
Frankfurt	Germany	RCA	TYMSAT CP64R	$42.70
Rome	Rome	RCA ITT WUI TRT	TYMSAT CP64R	not announced
San Juan	San Juan	ITT	TYMSAT CP64R	$19.72
Anchorage	Alaska	RCA	TYMSAT CP30R	not announced
Hong Kong	Hong Kong	ITT RCA WUI	TYMSAT CP64R	$24.96
Mexico City	Mexico City	CONACYT	TYMSAT CP30R	$13.16
Edmonton	Edmonton Vancouver Calgary	TCTS	TYMSAT CP30R	$7.24
Toronto	Toronto Ottawa Montreal	TCTS	TYMSAT CP30R	$7.24

Typical Costs for International Access



International Locations Served by Packet Network Services

CCITT Codifies Data Multiplexing Schemes

By Sherban Popovici
Special to CW

Telex service, which became widely used internationally after World War I, provides a backbone of data communications for many governments and private entities, particularly in the developing nations.

Since Telex provides dial-in teletypewriter hard-copy service between subscribers, with the added advantage that the answering terminal can be unattended, it offers a convenient channel for users to access low-speed computer ports, particularly in those situations where a computer transaction may have a long delay.

At present, most Telex terminals are of the 50 bit/sec, 5-bit Baudot code type, with 75 bit/sec also being used in recent years. Since the data transmission capacity of a telephone line can be as high as 9,600 bit/sec, the Telex authorities, or users with large numbers of terminals themselves, employ time division multiplexers (TDMs) to combine the low-speed data streams and transmit them over a single high-speed facility. It follows that efficient multiplexing is crucial for distributed Telex networks.

In recognition of the growth of Telex traffic the CCITT, the consulting body that sets international communication standards and protocols which are usually also used internally by most member nations, adopted recommendation R101A codifying Telex transmission protocols at 50 bit/sec and 75 bit/sec, as well as the multiplexing of the terminal data streams.

The CCITT also recognized the growth of computer transactions and computer networks and so set another recommendation, R101B, that accepted terminal rates up to 300 bit/sec and codes other than Baudot, in particular 8-bit Ascii. The multiplexing scheme for the resulting heterogeneous mix of speeds and codes was also included in R101B.

Recommendation R101B offers a more efficient multiplexing scheme than R101A. For example, while R101A allocates two 50 bit/sec channels to each 75 bit/sec data stream, effectively squandering 25 bit/sec bandwidth in the process, R101B allocates bandwidth on the aggregate on a more flexible basis. A 2,400 bit/sec high-speed aggregate can carry only 23 75 bit/sec channels multiplexed according to R101A, while R101B can accommodate 30 75 bit/sec channels. Figure 1 shows a conceptual diagram of the scope of both recommendations.

The adoption of R101B provided an impetus for networks that would accommodate the simultaneous multiplexing over high-speed lines of both conventional Telex and the higher data rates set by R101B, and go further in accepting the transmission rates employed by the more recent terminals and remote job entry units now in use, such as 1,200 bit/sec asynchronous and 2,400 bit/sec and 4,800 bit/sec synchronous.

Recently an advanced design TDM that is particularly suited for data/telex networks has been introduced in world markets. The unit accepts up to 96 input "low-speed" channels operating at 5-, 6-, 7- or 8-bit code and at any asynchronous rate to 2,400 bits/sec. Synchronous rates that are a submultiple of the aggregate data rate are also standard. For example, a high-speed transmission rate of 9,600 bits/sec permits the operation of a 4,800 bit/sec terminal.

The networking capability of the unit is further enhanced by its "bypass" feature, which allows the multiplexed data streams from one remote TDM to be merged with those from another remote TDM and share the transmission

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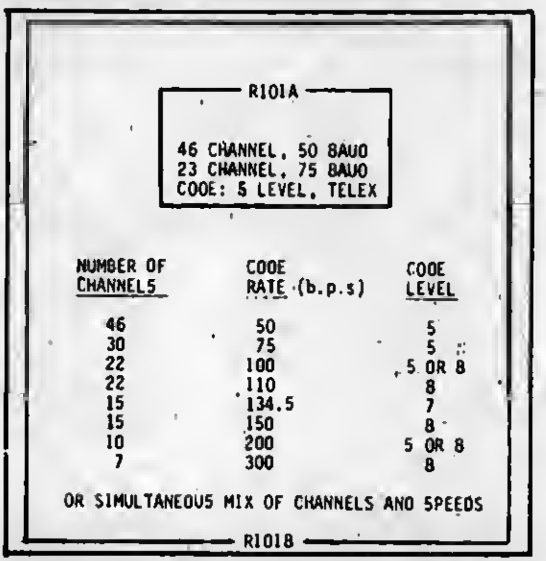

46 CHANNEL, 50 BAUD
23 CHANNEL, 75 BAUD
CODE: 5 LEVEL, TELEX

NUMBER OF CHANNELS	CODE RATE (b.p.s)	CODE LEVEL
46	50	5
30	75	5
22	100	5 OR 8
22	110	8
15	134.5	7
15	150	8
10	200	5 OR 8
7	300	8

OR SIMULTANEOUS MIX OF CHANNELS AND SPEEDS

Figure 1. Schematic of Scope of CCITT Recommendations.

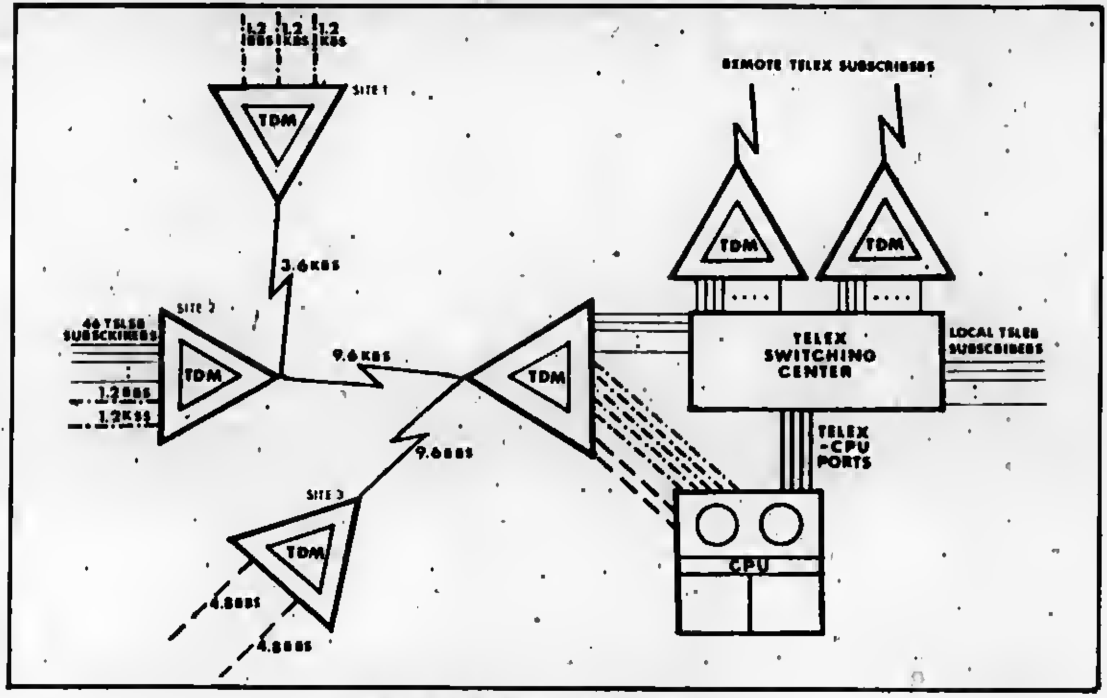

Figure 2. Data/Telex Network

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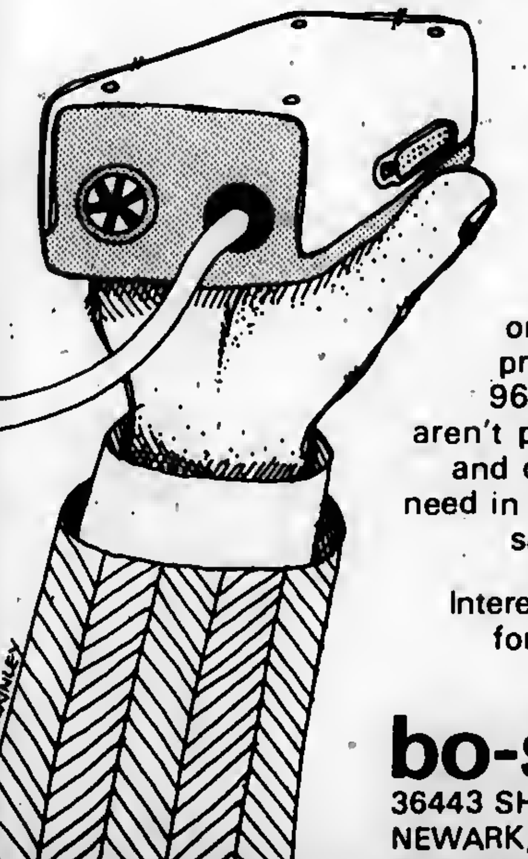

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At Virginia User Site

Micro-Based Telenet Interface Up and Running

The first microcomputer-based processors designed to interface computers and terminals to the nationwide Telenet packet network are running at American Management Systems in Arlington, Va.

The communication processors are the result of a three-year development effort at Telenet and are being made available for on-site customer installation this fall. Designed as plug-in interfaces to the network, the units require no changes in customer hardware or software and feature statistical multiplexing, end-to-end control and remote diagnostic and control software.

Checking over the TP-2000 are Harold Tranter (left) and Tom Martin of AMS.

The first two models, the TP 1000 host/terminal interface concentrator and the TP 2000 host interface processor, were tested over an eight-week period in the Computer Services Division of AMS. The first AMS clients were tied into the processor via Telenet with virtually no interruption of normal service, according to AMS Vice-President Tom Martin.

AMS decided to connect its IBM mainframes and Memorex 1380 front-end processors to the Telenet network in December 1976 rather than extend its own private network. Having immediate nationwide access is critical for the company, which markets interactive computer applications on both IBM and DEC equipment to government agencies and corporate clients with multiple office locations.

The public network is also used internally by other AMS regional offices scattered throughout the country for the company's consulting and systems development activity. AMS plans to eventually eliminate use of its own network and utilize Telenet to concentrate all of its data traffic, Martin said.

Initially AMS installed a conventional multiplexer to interface remote users over the Telenet network.

Main Incentives

According to Martin, the main incentives for converting to a TP 2000 were the overall benefits of the unit's CCITT X.25 protocol, which assures virtually error-free transmission, and its capability of handling all asynchronous terminal speeds on a single rotary. "Telenet essentially delivers us a stream of Ascii characters, relieving us of the problems related to management of terminal types, speed and error checking," Martin said.

The TP flow control feature permits the AMS computers to communicate to the Telenet network at 1,200 bit/-sec, while terminals at the remote end operate at any speed from 75 bit/sec to 1,200 bit/sec. The network performs a throttling function, in cooperation with the Memorex 1380, to adjust for differences in speeds at each end of a connection. By interfacing to the Memorex 1380 at 1,200 bit/sec, instead of 300 bit/sec, propagation delays over the asynchronous host connections are significantly reduced.

"The result should be a noticeable improvement in response time," Martin said.

Martin believes, in the long run, the TP 2000 will prove more economical than the multiplexer previously used. AMS' present costs for the TP 2000 and 12 1,200 bit/sec ports run $1,090/mo plus $320/mo for a 4,800 bit/sec access line from Arlington to the closest Telenet central office in Washington, D.C. The multiplexer alternative with 10 300 bit/sec and one 1,200 bit/sec port costs $1,140/mo including a 4,800 bit/sec access line to the Washington central office.

However, the TP 2000, which uses statistical multiplexing techniques, will permit the company to support additional terminals without increasing circuit capacity. According to Telenet, the new units will support over twice as many terminals per circuit as a conventional multiplexer.

The comparatively lower costs of adding 1,200 bit/sec ports is another benefit in the long run for Martin, who added that "we're seeing a tremendous increase in demand for 1,200 bit/sec access."

AMS will be able to add four additional 1,200 bit/sec ports to the TP 2000 at $80/mo, whereas the company's cost to add four 1,200 bit/sec ports to the current multiplexer configuration would be about $520/mo including the circuit speed upgrade required.

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AMARILLO, Texas — Corporate Systems here is a company that specializes in helping other companies analyze and manage risk factors in an effort to reduce insurance costs.

Through the use of computer techniques, Corporate Systems has been able to slash the cost of insurance for its clients by as much as 30%, a significant savings for many companies whose annual insurance bills may run into the millions of dollars.

To communicate more effectively with its clients and provide more rapid collection of data relative to risk situations, Corporate Systems has developed a dispersed processing network which extends to most sections of the U.S. The dispersed processing network is based on two Datashare business time-sharing systems from Datapoint Corp.

The two central processors for these Datashare systems, Datapoint 5500 business processors, are located in Corporate Systems' offices here. From that location, each of the 5500s will provide on-line computer power to up to 16 3600 video display workstations situated in client offices.

Leased or dial-up telephone lines provide the communications link between the terminal units and the central 5500 systems.

When data is transmitted to the 5500 processors from workstations in the network, the data is collected on magnetic tape units associated with the systems. These tapes are then transferred to Corporate Systems' central IBM 370 system, where the data they contain is used as the basis for the development of special risk management reports.

Management Reports

Programs in the Corporate Systems proprietary library are used to develop a range of management reports that help a client company's financial managers and insurance representatives do a better job of purchasing insurance.

Reports cover the areas of casualty risk management, loss control and safety analysis, property and special risk management, claims and expense management, retro-trend (for managing retrospective and loss-rated premiums) and Osha recordkeeping for employee injury and illness data. Based on data supplied to the central system by the dispersed processing network, these programs can provide, on a weekly or even more frequent basis, those reports needed to make wise insurance purchases.

Clients for the Corporate Systems service include insurance brokers, insurance companies, government agencies and large corporations. All told, Corporate Systems is now providing its service to approximately 250 clients, who in turn represent about 800 other companies. Those clients handling the greatest volume of risk management data have on-site workstations that can be used to enter data to the dispersed processing network.

The data entry terminals utilized at client sites are Datapoint 3600 video display workstations with which operators can immediately display data as it is entered from source documents.

According to Don Riggs, vice-president in charge of Corporate Systems' computer operations, the screen display has played an important part in the reduction of input errors.

"Entry formats are displayed on the screen of the workstation for each application, thus providing for more accurate entry of data," he explained. "Since these formats 'guide' the operator through all the steps and procedures involved in any of the various applications, training time has been kept to a minimum. In fact, operators hired by our clients can usually master any particular data entry operation in an hour or two," he said.

Operators at the workstations convert data from source documents such as premium payment stubs, claims applications and policy coverage changes and adjustments. The claims data, converted and transmitted to the central computer facility, may relate to worker's compensation claims, fire and theft losses, property damage or other business hazards.

Guided by programs lodged in the host processor, an operator at the workstation can also set up claims, change reserves, add payments, change claims status, update systems design, maintain premium files and verify the entered data. Because the 5500-based Datashare systems are time-sharing systems, operators at the display units can access a variety of programs independently and simultaneously, depending on individual work assignments.

Forms Reduction

Corporate Systems and its clients have enjoyed other advantages with their dispersed processing network.

"We have eliminated the costly and arduous task of filling out forms manually," Riggs noted. "This job previously required a lot of clerical help. With the dispersed processing network, employee productivity has risen sharply and data entry errors have dropped significantly.

"Also, the computerized approach has reduced the amount of space that clients heretofore needed to store bulk paper records," he said.

Another advantage of the network is that operators in client offices may use their workstations for on-line retrieval of information that is stored in mass memory in Amarillo. For example,

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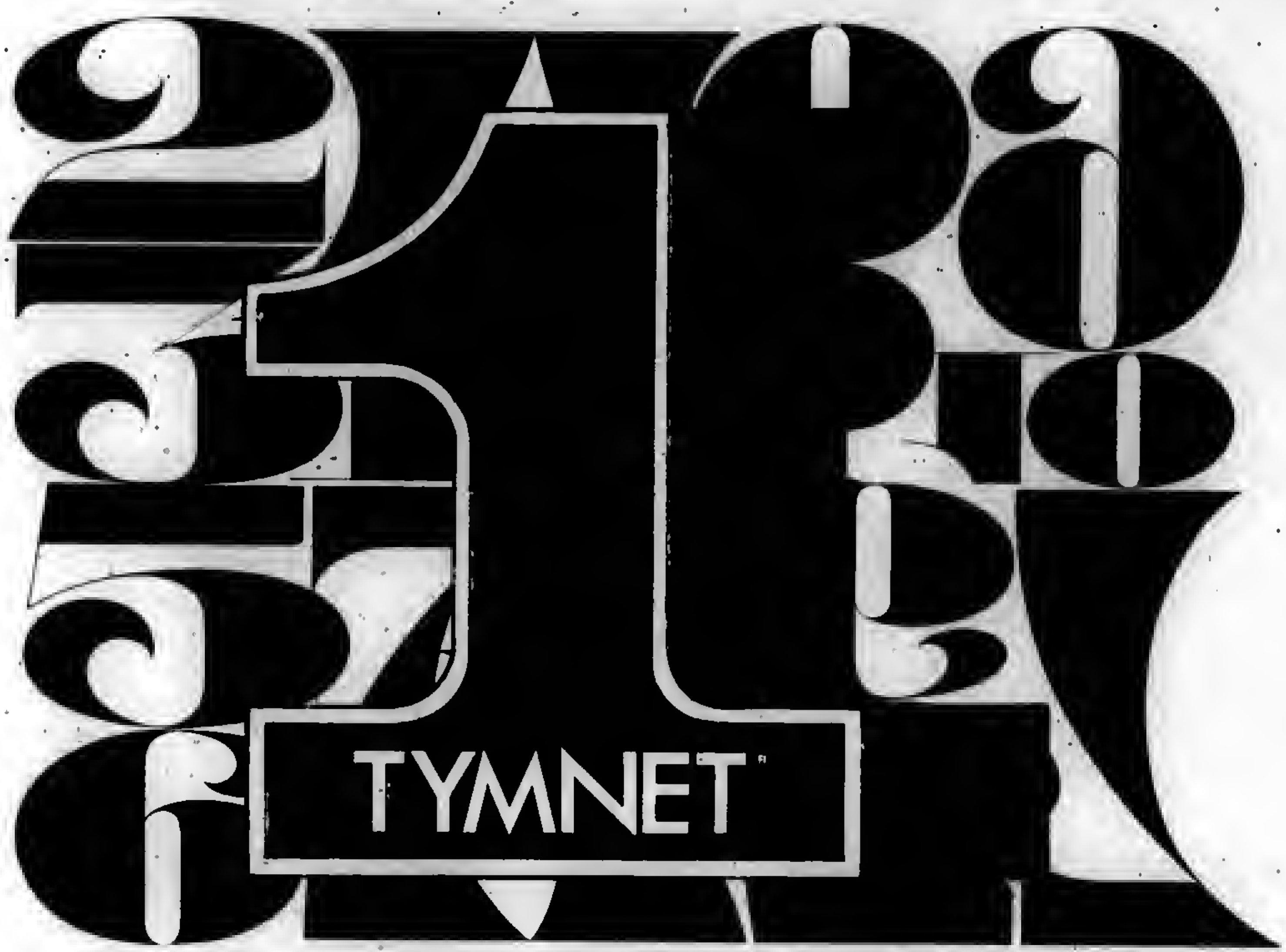

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Consider these statistics about TYMNET, which in a typical day:
- utilizes over 265 intelligent, mini-computer nodes
- makes available over 2,500 access ports
- supports over 1,300 simultaneous terminal users
- services over 150 host computers
- carries approximately 300 million characters

TYMNET's success story is not accidental. It's based on long experience and sound planning, the use of advanced packet technology, plus an appreciation and understanding of the market for specialized data communications services, directed towards users whose network needs encompass time sharing, data base access, and message switching. These applications are distinguished by a large number of connections between geographically dispersed, low-speed (1200 bps and below) terminals and a central computing facility. Typically such transmissions cannot be handled conveniently, reliably, or economically on standard communications facilities. But with Tymnet's existing, public packet network service users can take advantage of the operating efficiencies and economy of a national communications network designed specifically for these applications.

By incorporating the most advanced computer and communications technology in the network, Tymnet is able to offer its users a reduced operating cost plus a greatly improved communications facility.

Users of TYMNET benefit from:
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- alternate routing if a direct transmission facility should go down
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- significant cost advantages
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Domestically, TYMNET today provides access in over 130 cities — and the number of locations continues to grow. International operations can also be served by TYMNET, through interconnect agreements with the International Record Carriers which provide access in major world cities, from Rome to Hong Kong.

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Converting From 'Paper Nets'

System Eases DP Phase-In for Insurance Agents

By Thomas A. Harlan
CW Staff

A stock phrase among insurance professionals is, "We have a paper business." However, current trends indicate that this condition will not continue. There is an increasing move toward utilization of DP techniques to eliminate the inefficiencies inherent in storage and transfer of data via paper records.

Efforts by the industry to create viable standards and to position DP technology in relation to the development of the needs and requirements of the insurance profession have resulted in a considerable amount of debate. What is needed is an approach that is sufficiently flexible to meet future evolutionary changes, but which is efficient when applied to today's problems.

One approach being taken today makes it easy for the independent insurance agent to incorporate a methodology which allows use of DP without enforcing rigid limitations. It provides for future modifications to suit users' changing requirements and is designed to allow the user to work easily with industry standards that may be developed in the future.

From a system point of view, it is a straightforward conversion of traditional insurance "paper networks" to data networks that increase in sophistication to meet demand. Each stage may be operated by insurance personnel, since minimal DP knowledge is required.

Stages of Development

In the system provided by Independent Agent Center, Inc. (IAC), every user starts by using a batch-processing approach, regardless of the size of its operation. This procedure reduces difficulties sometimes encountered in transitions from manual bookkeeping to automated systems and shortens the time required for the transition. Because of the flexibility inherent in this approach, a transition to more sophisticated approaches (in-house DP and interactive operation) is facilitated as well.

In the batch approach, typed documents are received and input is either keypunched or optically scanned in Houston. Routines used in the batch processing include a variety of checks and evaluations of input data, so client personnel have the benefit of interaction with IAC specialists. This process helps make the transition from manual to automatic DP more efficient, with reduced error volume, even in early stages.

Increased sophistication is provided at the second level by utilization of a computer in the client's facilities. This processor includes a software array that provides immediate response to such everyday requirements as customer status, automatic document processing, rate information for preparation of policy quotes, etc.

Data is captured on a floppy disk and is relayed to IAC's central processor for generation of a backup data base and preparation of certain reports that have longer allowances for turnaround time. By utilizing a preprocessing stage to perform functions where rapid response is important, coupled with the use of a larger DP system capable of cost-efficient handling of detailed data analysis, users get cost efficiencies and operational benefits of two-level networking.

A third-level alternative that may be dictated by user's needs is the application of a data terminal with storage at the user site. This terminal allows off-line preparation of input data, rapid data transfer to the IAC mainframe and interaction between the terminal and central processing facility. Duplicate data bases provide redundancy for long-term file integrity.

Training in the utilization of this approach works from the top down. By familiarizing top management with what will occur and what results are to be expected, a smooth integration is effected. Moving from one operating level to the next is a natural evolution, occurring when needed, and without significant change in

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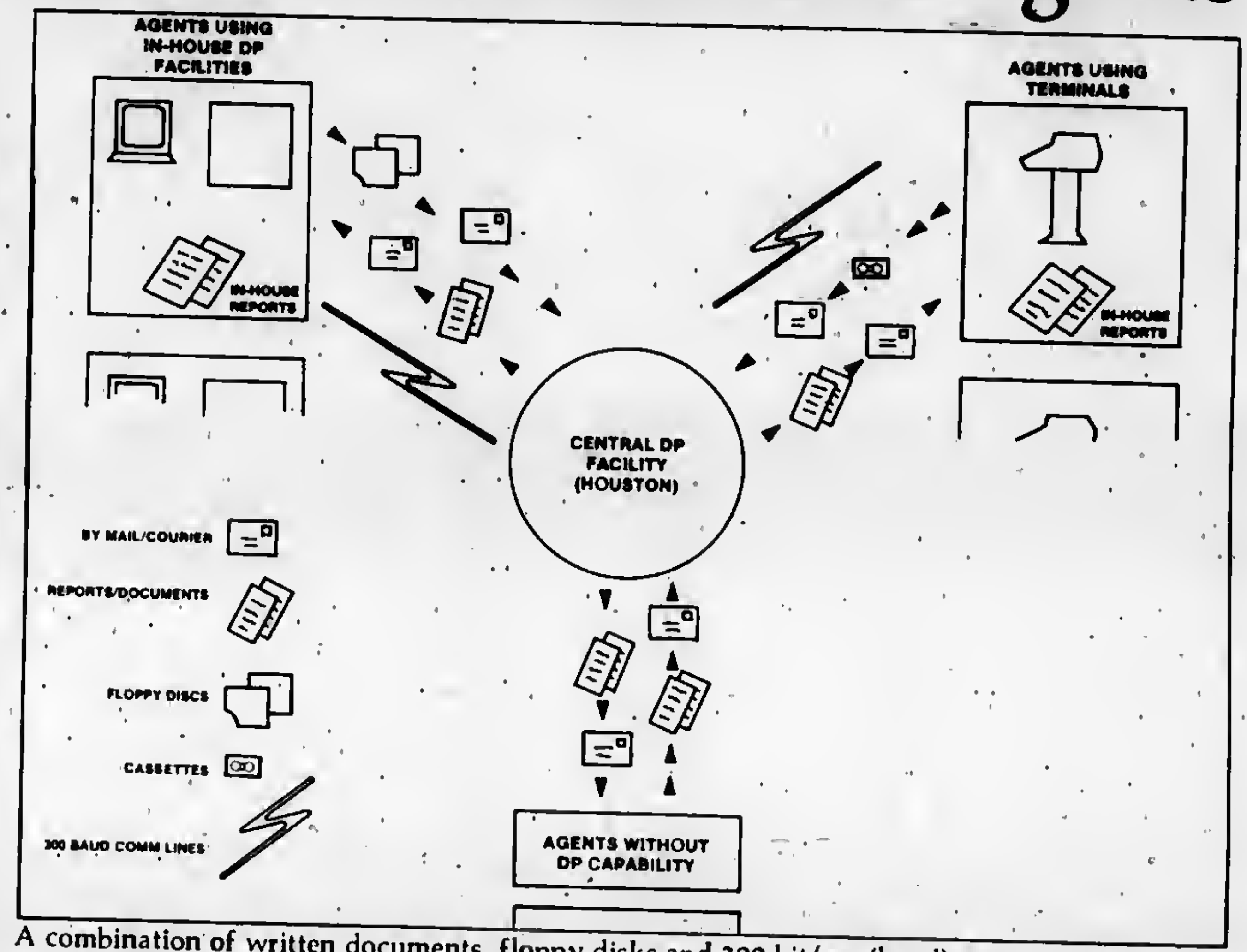
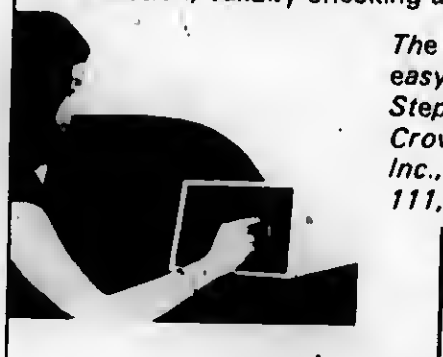


A combination of written documents, floppy disks and 300 bit/sec (baud) communications lines are used in this system now in operation between Independent Agent Center, Houston, and agents in five states.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GREYHOUND
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[illegible] bound to [illegible]

[illegible] Dumb Terminal™ really does have two [illegible]

At [illegible] they weren't quite as well known, [illegible] their Dumb Brother's smashing success [illegible] stealing the show. Although they had been [illegible] quite well all along, even without getting [illegible], like their Brother.

[illegible], Dumb Brother has pulled them [illegible] And ADM-1 and -2 have decided, [illegible] it's time you knew a little [illegible] smart they really are.

[illegible] the more intelligent of the two, [illegible] with flexibility of format, security, [illegible], and transmission. You'll find, [illegible] of other outstanding features, up [illegible] indicators and a numeric key [illegible] keyboard with 16 function [illegible] you the ability to access your [illegible] program, or form, or instruction.

ADM-2 is also available in a model com[illegible] your Burroughs TD-800 Series. The ADM-2B adheres to the standard [illegible] and address line discipline.

[illegible] all that, we've made the ADM-2 [illegible]. And taken all the mystery [illegible]. Which makes user-micro[illegible] quick, [illegible] cost-effective. The [illegible] is [illegible] your [illegible]

You [illegible] ADM-1, [illegible] some [illegible] dard [illegible] dual [illegible] modes [illegible] build [illegible]

[illegible]

So, you might as [illegible] -2 in [illegible] now [illegible]

TNS Developed for Short Inquiry Applications

By George M. Dick
Special to CW

AT&T has announced a special-purpose communications network called Transaction Network Service (TNS). This service, designed by AT&T, is currenty tariffed by the individual Bell operating companies and, thus far, only the companies in the states of Washington and Minnesota have elected to offer TNS.

TNS has been designed as a complete system for short inquiry/response applications. Although the service can be used with customer-provided terminals, the Bell System offers three terminals (as separate products) that complement the functions of the service.

These terminals are also offered only by the individual operating companies; one of the terminals, as with TNS itself, is available only in Washington and Minnesota. All of the Bell terminals can interpret the information provided by the American Banking Association's magnetic stripe (track-two standard), and consequently, are geared toward financial applications at the present time.

The basic concept of TNS consists of a message control center (located on Bell premises) that is connected to remote terminals via low-speed asynchronous lines and to host computer sites via high-speed synchronous lines. The center is responsible for protocol maintenance, message switching, code and speed conversion, address interpretation, error control and general overhead functions such as network maintenance and diagnostics.

There are actually two catgories of TNS, dial-up and polled, which are called Switched Telecommunications Network and Polled Access Network.

Dial-up telephones (including Touch-Tone and Transaction telephones as well as non-Bell units) access TNS through the Switched Telecommunications Network (STN) under existing tariffed telephone services. Messages are sent from the terminals in Touch-Tone format to a maximum of 10 char./sec. Response to the terminal can be voice response only, voice and keyed answer tone response or 150 bit/sec data response.

The keyed answer tone response is simply a tone designed to light an indicator lamp. The voice responses are composed by the customer's host computer through selection from a TNS vocabulary; size of the vocabulary is determined by each operating company.

Response mode limitations are determined by the terminal's capability. Telephones (terminals) with 12 Touch-Tone characters are limited to voice-only responses, while telephones with 16 Touch-Tone characters can receive any of the three response types.

Each terminal is connected to the Polled Access Network (PAN) through a shared telephone circuit (dedicated to TNS) known as a Polled Access Circuit (PAC). The PAN controls a polling sequence that allows each terminal access to the network.

The quantity of terminals allowed on a single PAC is not specified; however, access delay, defined as the time between completion of loading the terminal and the receipt of the beginning of the poll to that terminal, is designed to be less than 1.25 sec averaged over a time-consistent busy hour of the busy season.

As with dial-up, the terminals can be Bell-provided or customer-provided. Because of the shared line configuration, polled service is available only in certain areas.

Polled terminals designed for use on the PAN are required to recognize the polling sequences and use the protocol and message format defined by the network. Text information, of course, is left to the customer. Transmission is asynchronous (half-duplex) at 1,200 bit/sec using the seven-bit Ascii information bits, a start bit, a parity bit and a stop bit.

The network is transparent to Ascii text information except for control characters. A tone or voice answer-back will not be delivered to a polled terminal.

Host Computer

The customer's host computer is connected to the network by dedicated full-duplex synchronous facilities at speeds of 2,400-, 4,800- or 9,600 bit/sec. The host computer may elect to offer service to only dial-up terminals, a restricted group (or groups) of polled terminals, all polled terminals or any combination of the three categories.

The host computer may also elect to accept messages from all other host computers or only from "affiliated" hosts. In all cases, the network will screen the messages to assure that only those messages that a host wishes to accept will be delivered.

All communications with the network are accomplished via Ascii with odd parity and control procedures in accordance with Ansi BSRX3.28-1971. Enhancements are included that make the data link control procedures compatible with the BSC procedures used by many systems today.

At the customer's option, the communications link may be analog or digital (DDS). Analog facilities are provided by Bell via its 201C, 208A or 209A data sets.

If the link is digital, a Data Service Unit (DSU) or Channel Service Unit (CSU) at the appropriate speed is supplied. The customer may elect to supply his own (Bell-compatible) modem

(Continued on Page S/34)

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For the large business user, with an existing central mainframe, the VDP-80 is the ultimate remote processor. You have the advantage of powerful local processing capability, plus the epitome in cost-effectiveness for implementing a distributed data communications network.

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☐ **Megabyte Mass Storage.** PerSci dual floppy, double density disk drive standard. One million byte storage capacity. Three floppy disk drives can be added-on, providing 4 million bytes of on-line storage.

☐ **Drives Printers, Plotters, Terminals, Modems and Tape Drives.** Supports up to six terminals or modems, and four tape drives. Drives plotters, serial printers and line printers (up to 300 lpm).

☐ **12"CRT, 24x80 Field, User Programmable Font.** Character and line insert/delete allows fast program correction and text editing. Inverse video and programmable field allows highlighting or enlarging graphics of information display. Titled fields protect information blocks from being written over accidentally. Programmable font (up to 256 different characters) allows foreign language and special purpose character forms.

☐ **Alphanumeric Intelligent Keyboard.** 62-pad main keyboard. Programmable 12-pad numeric keyboard. 12-pad control keyboard. Standard typewriter and calculator keyboard layouts. "N" key roll over reduces operator error during high-speed data entry.

☐ **Commercial BASIC, FORTRAN IV, DOS Software.** Built-in ROM monitor allows extensive debugging and diagnostics. BASIC, interactive or compiler version. FORTRAN IV level 2 ANSI compiler. DOS-enhanced CP/M.**

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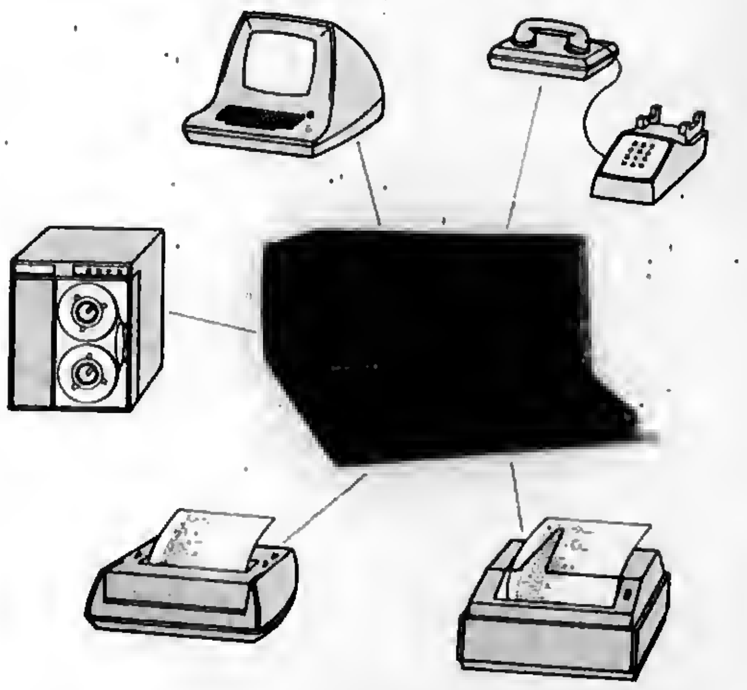

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Diverse Standards Complicate Communications

(Continued from Page S/2)

Consultative Committee (CCITT) is an international body composed mainly of members of the Postal Telephone and Telegraph (PTT) organizations, which administer communications facilities and services in their respective countries. The CCITT establishes special study groups to develop and propose standards for all facets of communications including modems. Although these standards are not mandatory or binding, the majority of PTT administrations promote practices which conform to CCITT standards. Thus, in Europe, as in many other parts of the world, the existing standards are CCITT compatible.

The existing Bell and CCITT standards for modems are mostly incompatible. That is, a user will normally not be able to obtain a Bell unit in the U.S. and communicate through a PTT-supplied unit in another country. There are, however, almost exact one-to-one functional equivalents in types between Bell units and CCITT units which are designated by a CCITT recommendation. Table 1 shows the relationship between types along with their basic functional characteristics.

The only speed at which compatibility does exist is at 2,400 bit/sec. The 201 modem is compatible with the V.26 unit in the "B" modulation modem. (Recommendation V.26 includes two modulation modes designated A and B, with only the B mode being operable with 201 types. The B mode is becoming the "standard" V.26 mode.)

For the low-speed 300 bit/sec and 1,200 bit/sec asynchronous types and the higher speed units at 4,800 and 9,600 bit/sec no compatibility exists. The 103 and V.21 units use different base frequencies as do the 202 and V.23 types. At the higher speeds, the lack of compatibility is caused by differences in modulation types, scrambler patterns and by variations in the training sequences used in the automatic line equalization process.

Of course, modem compatibility is not the only issue complicating international data communications. The U.S., as well as several PTT administrations, has various restrictions as to how data can be transmitted, especially when using dial facilities. It is essential that the user explore these limitations with the appropriate authorities before beginning.

CCITT-compatible and Bell-equivalent modems are available from several sources both domestically and outside the U.S. In the majority of instances, outside the U.S., the user is required to obtain modems from the PTT organization or use units which have received "type approval" from the PTT.

Lowry is director of product marketing at Codex Corp., Newton, Mass.

Control Centers Reduce Outages

(Continued from Page S/2)

ligent since the late 1960s. It was not the constant embarrassment by customers through the use of complicated technical control centers which piloted the increase in vendor expertise. Rather it was the competitive nature of the industry and the easy flow of talented people throughout that has helped the industry to grow and "forced" the vendors into knowing what they are doing.

The idea of increased user uptime is a sensitive subject for many designers of technical control centers. In reality, the very nature of a technical control center tends to add to user outages.

The majority of the time, the equipment installed in a technical control center is used primarily to diagnose network problems. However, in doing so, care must be taken; a misinterpretation, miscalculation or mistaken switch setting can waste valuable time while someone chases erroneous symptoms.

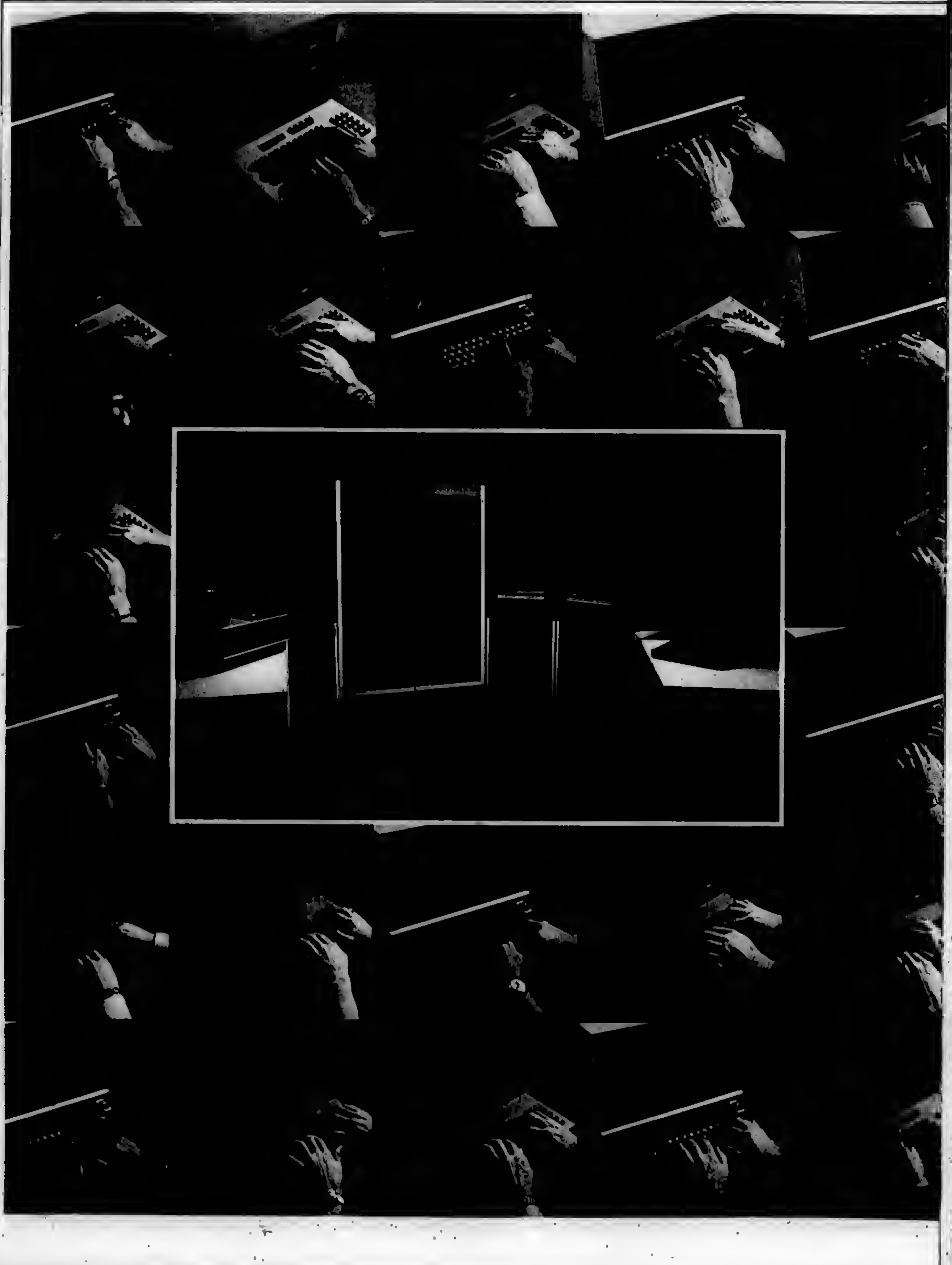
This may not have been a problem when the particular control center was installed, but through employment turnovers, employee transfers and managerial promotions of the highly skilled individuals, the less qualified are forced to perform in this difficult situation. The net result is more outages (through mistakes) and more user downtime.

Through experience, the various vendors have learned not to react too hastily to a customer's analysis of a problem; they take the same repair steps regardless of the sophistication of equipment involved at the customer site. Therefore, the time spent carefully narrowing down the specifics of a failure usually only means added outage on the network.

The answer for future network management needs lies in the concept of automated technical control centers. With the increasing complexity of networks, these automated facilities require less operational/monitoring personnel, monitor all of the critical and testing functions, notify an attendant of a possible problem and suggest probable corrective actions for remedy. In many circumstances, a failure can be detected, diagnosed and repaired without the user even knowing anything was wrong.

When designed properly, the automated facility can provide the statistics needed to perform all of the tasks required for thorough and proper data network management.

Coleman is a systems engineer with the Federal Reserve Bank in Chicago.



Services of Six Banks in 26 Stores

Supermarkets Gain Savings Bank Functions

ORLANDO, Fla. — A network of customer-operated terminals in 26 Kash 'N Karry supermarkets here is performing savings and loan transactions. Depositors of six different savings and loan associations in a three-county area surrounding Tampa and St. Petersburg can take advantage of the new service at no cost.

The new service, called Modern Money, extends savings and loan services to convenient supermarket hours and locations by allowing depositors to cash checks and make deposits and withdrawals from their savings accounts. The transactions are electronically transmitted to the shared clearing and processing center for processing against a customer control record or switching to the savings and loan data center for authorization. The transactions are implemented over 1,200 bit/sec asynchronous telephone lines and backed up with written copies.

To minimize the use of supermarket personnel, the terminals are entirely customer-operated and are located away from customer service counter and cashier areas of the store.

Modern Money Cards

Security is maintained by plastic Modern Money cards containing magnetically encoded information about the depositor and secret identification codes, which must be entered before the terminal will accept or verify a transaction. All cash transactions are handled by the supermarket service counter employees after verification by the terminal. In this way the terminals do not contain cash, but can process cash transactions.

The supermarket terminal transactions are identical in form to savings and loan transactions: withdrawals are immediately deducted from savings balances, deposits are credited subject to collection and checks are cashed against savings account balances until the checks clear.

On a daily basis the savings and loan association receives a statement of each customer's account and a listing of all transactions. The supermarket merchant receives a reporting of every transaction (to use in balancing his cash accounting) and a weekly summary (to monitor store traffic patterns as they are affected by the terminals). The depositor receives statements from the savings and loan association listing all deposits and withdrawals, including those performed at supermarket terminals.

Hardware Configuration

A Data General Nova 3 minicomputer with 80K-bytes of memory performs the file and communications processing for the network. The secret personal identification number, account status, Modern Money card expiration date, listing of the types and limits of allowable transactions and a running current seven-day total of allowable transactions are maintained on a 92M-byte disk.

File updating of this information is provided via an on-line CRT after telephone inputs are received from the savings and loan. Terminal transactions are processed by the Nova 3 computer on a time-sharing basis and electronically relayed over phone lines to the DP center that maintains the master files for each depositor.

Other peripherals used in the network include a Data General Dasher printer; 1,600 bit/in. tape subsystem, 300 line/min line printer and DCU/50 data channel interface. Software for the system was provided by Transaction Data Systems and the network design by Systems Technology, both Orlando-based companies.

After a second Nova 3 computer is installed for the network within a few months, communications processing and file processing will be separated. The network will then accommodate up to 500 terminals.

Something for Everyone

To the Modern Money cardholder, the new service facilitates shopping, check cashing and savings and loan transactions. The supermarket retailer has increased store traffic, lower check cashing and credit card costs and less employee time required for these activities. The savings and loan institutions use the network to increase their service hours and locations at a cost that is shared by various financial institutions, since Modern Money is a statewide network.

The participating supermarkets are located in Pinellas, Hillsborough and Pasco counties surrounding Tampa and St. Petersburg. The six sponsoring savings and loan associations are Florida Federal Savings & Loan Association, Franklin Federal Savings & Loan Association and Guaranty Federal Savings & Loan Association, all of St. Petersburg; Freedom Federal Savings & Loan Association of Tampa; First Federal Savings & Loan Association of Tarpon.

Florida S&L Development Corp., an Orlando-based marketing and development firm, was formed to develop a cooperative funds transfer system for the savings and loan associations of Florida that could be shared with other financial institutions.

All at once, it's Harris.

Harris now delivers the most cost/performance effective multi-use computer system in the industry.

Our new family of high performance systems—S115, S125 and S135—together with our powerful VULCAN Virtual Memory Operating System supports more than 50 terminals. Simultaneously.

This is a whole new line of medium-scale, multi-use systems with increased reliability and new state-of-the-art technology. You get greater I/O throughput. MOS memory with error correction. Powerful micro processor based CPU. Broad selection of highly reliable peripherals. And all operate with ANSI 74 COBOL, FORTRAN, RPG II, FORGO, SNOBOL, and extended BASIC.

The Harris S100 systems take on many different jobs all at the same time: Multi-stream batch processing. Multiple concurrent RJE's, both host and remote. Multiple interactive time sharing. Real-time processing. And this new generation of high performance computer systems from Harris delivers these all to you, *concurrently.*

If your need is distributed processing, time sharing, data base management, or any type of concurrent multi-use application, *benchmark our new computer system against any other system in the industry.*

Harris Computer Systems, 1200 Gateway Drive, Fort Lauderdale, Florida 33309. Telephone (305) 974-1700. Europe: Harris Intertype, Ltd., 145 Farnham Road, Slough, SL1 4XD, England.

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COMMUNICATIONS AND INFORMATION HANDLING

System for Agents Eases Phase-In to DP Net

(Continued from Page S/11)

basic business operation.

Because all procedures are designed for use by insurance-trained personnel rather than DP specialists, training new operators is simplified and general understanding of the system is facilitated. "It makes it easier to use a system when even the salesman can understand how it works and what's going on," one user said.

Because flexibility is a paramount concern and utilization of the most technically advanced hardware enhances flexibility in this approach, the IAC maintains a continuing evaluation program for equipment selection. At present, DP systems installed within client facilities use the Data General Micronova processor with a 20K-word capacity, a Model 6012 CRT terminal, dual diskettes and a 60 char./sec printer for hard-copy output.

An optional Diablo printer is used in situations where users want the capability to prepare computer-generated letters and other documents that look like original-typed materials.

Where the user has a terminal installation, IAC is currently using the General Electric Terminet 30 with MTA II dual cassette tape. This 30 char./sec terminal provides capacity for auto-search and storage as well as interactive capability with the central DP facility in Houston.

Future Developments

An orderly network of written documentation is now the norm for the insurance industry. There is no doubt that the communication medium must be changed to meet increasing needs. In order to do this, a number of basic agreements must be reached so that some degree of standardization may be achieved.

In the absence of such standardization, IAC has taken an approach which it feels provides optimum flexibility and facility utilization. By using off-line file accumulation, for example, a variety of media may be accommodated: In installations with local DP capability, data may be transferred via floppy disk or transmitted directly to the CPU by telephone line.

With terminal installations, data may be accumulated in cassettes in the terminal, then transmitted via phone line to the CPU through a multiplexer, which provides multiple access to mainframe storage without queueing delay.

In addition, IAC has completed a study and is now beginning exploratory work aimed at a real-time reformatting procedure. When completed, this switching network will allow agents to communicate with insurance company computers without having to change programming to suit various formats.

A group of agents and insurance companies will participate in a trial program in which IAC will provide the "translation" through its computer facilities. This test with a prototype system will provide the basis for additional service capabilities to participating agents and will supply needed flexibility until industry standards are developed.

Such flexibility is essential for independent agents, since a given agent may deal with several insurance companies and no two independent agents necessarily work with the same groups of companies. Different formats, program variations and other details can make it economically impractical for data to be handled using modern DP technology, much less technologies now in development.

> *What is needed is an approach that is sufficiently flexible to meet evolutionary changes, but which is efficient when applied to today's problems.*

Inefficient communications have been the source of serious problems in other fields, and the insurance industry recognizes the need for positive action.

Thomas A. Harlan is vice-president of the Independent Agent Center, Inc., Houston, Texas.

With 65,000 Daily Transactions

Clearinghouse Handles Volume Stock Trades

CHICAGO — Options Clearing Corp. (OCC) has combined the accuracy and convenience of local data gathering with the control normally associated with large, centralized computer facilities by implementing a high-speed data entry communications network.

OCC is, under Securities Exchange Commission regulations, the sole clearinghouse for all exchange-listed stock options traded in the U.S. The daily volume averages over 65,000 complex financial transactions representing approximately 14.5 million shares of stock.

According to Jack L. Pecot, OCC's vice-president in charge of data processing, "by law, settlement for options trades must take place the morning of the business day following the trade — unlike straight stock transactions, which allow for a five-day settlement period.

"In addition to our tight turnaround schedule, we've had to deal with steadily increasing volumes. When we opened our doors April 26, 1973, we processed an average of 911 options contracts daily. On July 15, 1977, just over four years later, we processed an all-time high of 306,000 contracts.

"We anticipate a continuing pattern of growth, so a fast, reliable communications system that can handle large amounts of data is absolutely critical to us. We had to have the ability to compress data and transmit it at high speeds off-line in order to save both transmission and processor time."

OCC's communication network, initiated 15 months ago, includes a total of eight Mohawk Data Sciences (MDS) System 2400 data entry and communication systems installed at headquarters here and at OCC branch offices. Of the eight systems, five are OCC's and three belong to associated organizations in the securities industry.

Two System 2400s are located in Chicago, two are in New York, two in Philadelphia and one each in San Francisco and Los Angeles. New York and Chicago are linked via dual 56 kbit/sec high-speed data lines. There are dual 9,600 bit/sec lines between Philadelphia and Chicago and single 9,600 bit/sec lines from Chicago to San Francisco and Los Angeles.

The 32K MDS system utilizes an IBM 2968 protocol emulator that allows tape-to-tape communications compatible with OCC's two central 370/148 mainframe computers.

OCC serves and is owned by the five stock exchanges involved in the trading of options — the American Stock Exchange, Chicago Board Options Exchange, Midwest Stock Exchange, Philadelphia Stock Exchange and the Pacific Stock Exchange. Options, if exercised, grant the holder the right to purchase or sell, depending on whether the option is a call or a put, a given number of shares of stock at a given price.

Transactions 'Matched'

OCC is essentially a post-trade processor for options traded on the floors of the five exchanges. After trading hours, option-transaction data collected during the day on magnetic tape or punched cards is fed into each exchange's computer system for processing. These transactions must be "matched" daily; that is, "buy" orders must be balanced against "sell" orders. The matched trade data is then transmitted via the MDS off-line communications network to OCC's twin IBM 370/148 data center in Chicago.

Reports generated in Chicago are sent to the appropriate branch offices in print-image form on magnetic tape, which requires no further processing before they can be translated into hard copy. That means that OCC can use service bureaus with excess print capabilities in branch office cities to print out reports rather than invest

(Continued on Page S/24)

everybody wins. Mainly you.

You run a wholesale business. Two locations, 3000 customers and growing. But rather than hire more order clerks, you put a computer in your main office. Trouble is, feeding it orders keeps your clerks queued up, your direct line tied up, and your computer idling while your slowest operator taps out 30 words a minute.

We have a solution: A system that features our newest Dataspeed® 40 terminals clustered on a common controller in each of your two locations. Information is entered on a simple keyboard, with your own display forms to guide the operator, then held until all corrections are made and your computer is ready to receive it. Saves time. Avoids billing and shipping errors. Helps reduce inventory. Improves your cash flow.

Solving problems in data communications is an all-out commitment of the Bell System. If you haven't talked systems with your local Bell Account Representative lately, you're missing something.

The system is the solution.

Bell System

3270/3790 Users:
There's no way you can build or expand
Wrong! Here's how Raytheon lets you do

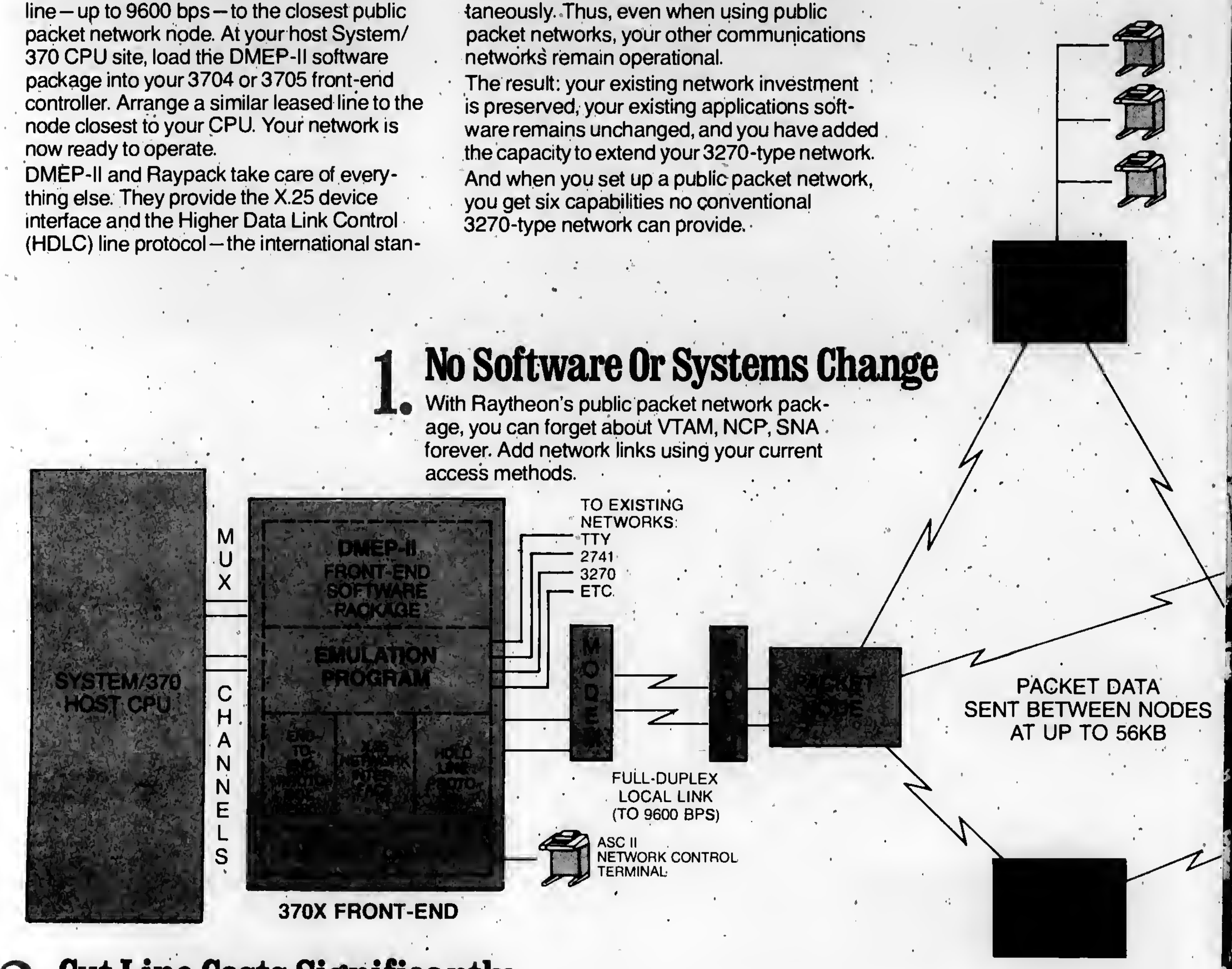
Put a PTS-100 controller, with up to 32 terminals, at each site at which you want to run 3270-type applications. Load it with Raypack software. Next, arrange a local leased line – up to 9600 bps – to the closest public packet network node. At your host System/370 CPU site, load the DMEP-II software package into your 3704 or 3705 front-end controller. Arrange a similar leased line to the node closest to your CPU. Your network is now ready to operate.

DMEP-II and Raypack take care of everything else. They provide the X.25 device interface and the Higher Data Link Control (HDLC) line protocol – the international standards used in public packet networks. Plus an operating system that enhances the Emulation Program in your front-end to allow it to perform under both bisynch and HDLC simultaneously. Thus, even when using public packet networks, your other communications networks remain operational.

The result: your existing network investment is preserved, your existing applications software remains unchanged, and you have added the capacity to extend your 3270-type network. And when you set up a public packet network, you get six capabilities no conventional 3270-type network can provide.

1. No Software Or Systems Change

With Raytheon's public packet network package, you can forget about VTAM, NCP, SNA forever. Add network links using your current access methods.



2. Cut Line Costs Significantly

Most 3270-type messages are easily convertible into "packet" messages used in packet networks. A single kilopacket – equal to about one million bits of data – costs less than a dollar to send from node to node, regardless of the distance between them. So your biggest line costs will be for local connections. And packet networks use efficient protocols, line-sharing techniques, automatic error correction, and no polling, so overall efficiency is improved too.

3. Cut Equipment Costs

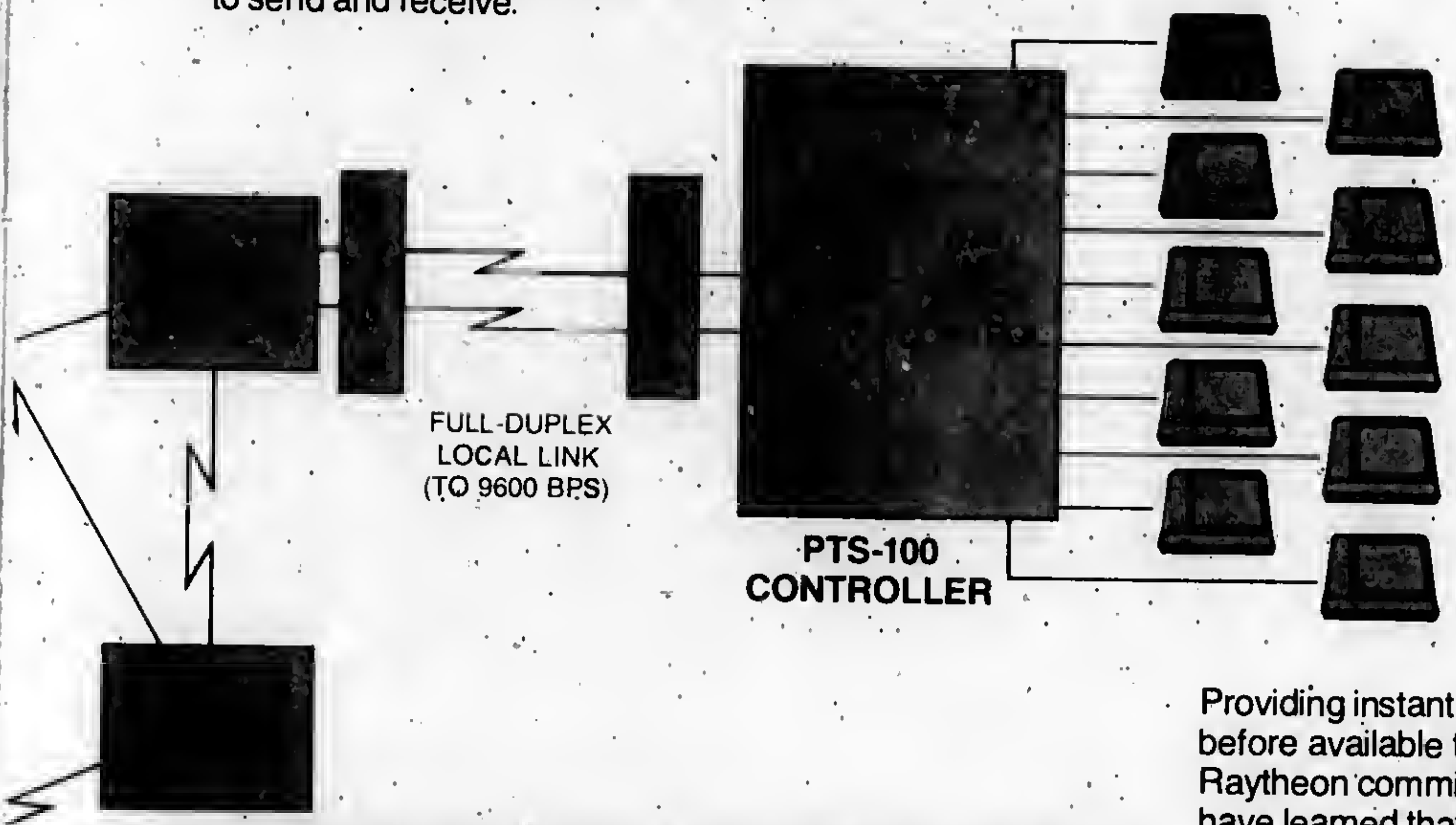
Start with Raytheon PTS-100 terminal prices – up to 30% below IBM's. Add to those the savings in front-end controller hardware by reducing memory overhead, eliminating extra ports and avoiding the extremely costly and complex implementation of VTAM/NCP. Then consider the advantages of full-duplex operation, higher data rates, and better response times – all of which reduce hardware requirements too.

an existing network in a hurry. Right?

it:

4. Immediate Availability

DMEP-II and Raypack are available right now from Raytheon. The PTS-100 system is deliverable within 60 days. When you get those products, you load DMEP-II in the front-end using the same system used on your 370X. You load Raypack on the PTS-100 controller. Each loads in just minutes. You are ready to send and receive.



5. Multiple CPU Links Without ACF

If you have a number of CPU's supporting 3270-type functions, you don't have to wait for (or pay for) IBM Advanced Communication Function (ACF) to allow terminal-to-terminal, CPU-to-CPU or multiple domain functions. You get them built into Raytheon's public packet software as standard features.

6. Multiple Data Paths, Ultimate Uptime

Public packet networks use multiple data paths — land lines, microwave, satellite — interchangeably. Each node searches for and uses the fastest, cleanest path available at the instant of transmission. Thus, your long-haul transmission links are continuously backed up to assure accurate and reliable transmission.

I am currently running ___ 3270 network links and have a requirement for adding ___ more:
___ In the U.S. only
___ In North America only
___ Throughout the world
Please ___ send me more information on your packet network capabilities
___ have a salesman call
Name: ___
Title: ___
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Remote System Cuts Power Use 10% to 15%

(Continued from Page S/2)

stream occupies only a fraction of the 2,400 bit/sec channel capacity. At this speed, peak distortion, which is directly related to the error rate, is close to 6%. The likelihood of error is not significantly increased over conventional multiplexers or other low-speed techniques.

This application is significant in several ways. The underutilization of channel capacity is offset by equipment savings and simplicity of system design, as no multiplexers, line bridges or specialized modems are required to combine the synchronous and asynchronous data streams.

Another factor is the ease with which the system can be modified, upgraded or reconfigured by altering the number and speeds of the channels on the 96 Multi-Modes. This is important, because Wetterau plans to upgrade its 4,800 bit/sec terminals to 7,200 bit/sec sometime in the near future.

An additional advantage of the 96 Multi-Mode is its ability to operate over a degraded phone line. By flicking a rate switch on the front panel, the line speed can be reduced to either 7,200 or 4,800 bit/sec, allowing reduction of number of encoding levels. Usually this can be done without interrupting the normal operation of the two channels.

Power Management

The software of the IBM System 7 allows it to poll each distribution center power control terminal every minute. These terminals have plug-in accumulator cards that store the updated electric-meter reading in anticipation of polling.

If power consumption exceeds a set level, the System 7 sends the terminals a shed-load signal. This is accomplished via a wall-mounted relay box. Various appliances at the remote distribution centers are then shut down, such as air conditioners, heaters and battery chargers. No appliance is shut off more than once every 15 minutes, and average shutoff time is about five minutes.

Various fail-safe mechanisms are built into the system. Freezers, for example, have a built-in temperature override. If a freezer's temperature is above a given point then its refrigeration unit can bypass any attempt by the power control system to shut it off. This feature is especially useful on hot days and on days where frequent loading and unloading takes place. At other times, five-minute shutoffs have no effect on food preservation and provide energy savings.

There are additional safety features. If the System 7 fails to poll a given distribution center or if a center fails to acknowledge within a given three-minute period, an automatic bypass takes over that allows all equipment at the affected site to be turned on. Protection against terminal or switching-panel power failure is provided by a double relay system, which requires one relay to be in the "on" position while another is off. In the event power fails to these relays, all appliances can be turned on.

The central-site communications control center was built by Wetterau. It is designed to deal with just about any kind of line or equipment problem, though, to date, problems have been minor. Monitoring, testing and patching capabilities in place keep tabs on all phone lines, modems and interfaces.

A VF patch panel aids in monitoring network functions in conjunction with several pieces of test equipment. An oscilliscope allows continuous monitoring to visually verify system and phone lines. Lines can be further checked for attenuation frequency response using a line transmission test set. Checking of error rates is facilitated by a modem test set.

Further simplifying fault isolation are the 96 Multi-Modes. They have built-in test features that allow them to perform local and remote line loops and to generate test signals.

Wetterau's energy management system generally saves 10% to 15% on average energy consumption in the majority of our distribution centers. Savings are significant when one considers typical energy consumption/day figures for some of these locations range from 10,687 kW hours to 18,000 kW hours. It's hard to put a dollar value on these savings, since they fluctuate from day to day and are influenced by environmental factors such as temperature.

What types of energy waste does the energy management system correct? Usually the unseen ones. At one of the distribution centers the firm noticed a sharp jump in energy use at a certain time every day. When the problem was investigated, it was a worker turning on the battery chargers to give the batteries a "boost." It was found that the batteries didn't need the charge at that time. Now the control system running 150 bit/sec asynchronous data over a 2,400 bit/sec synchronous channel turns the charger on at night, when the rates are cheaper. And it was found that turning the charger off for a few minutes during the charging cycle gave the batteries a better charge.

Future plans for the system include the attention of distribution center security routines to the power management system. These will allow central site personnel to monitor the system to spot unauthorized access to distribution centers after hours.

Hiatt is a programmer and technician at the DP center of Wetterau Inc., Florissant, Mo.

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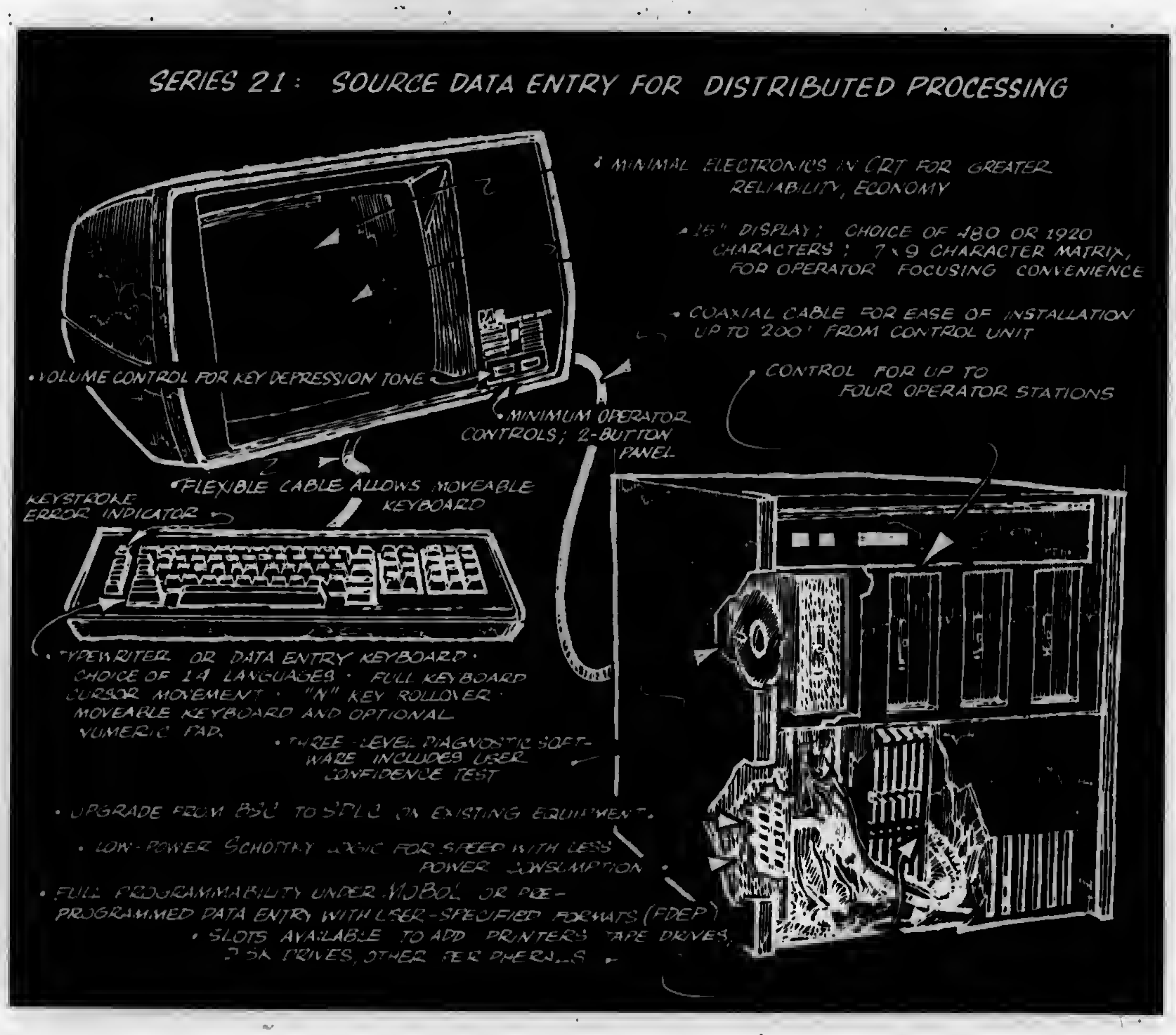
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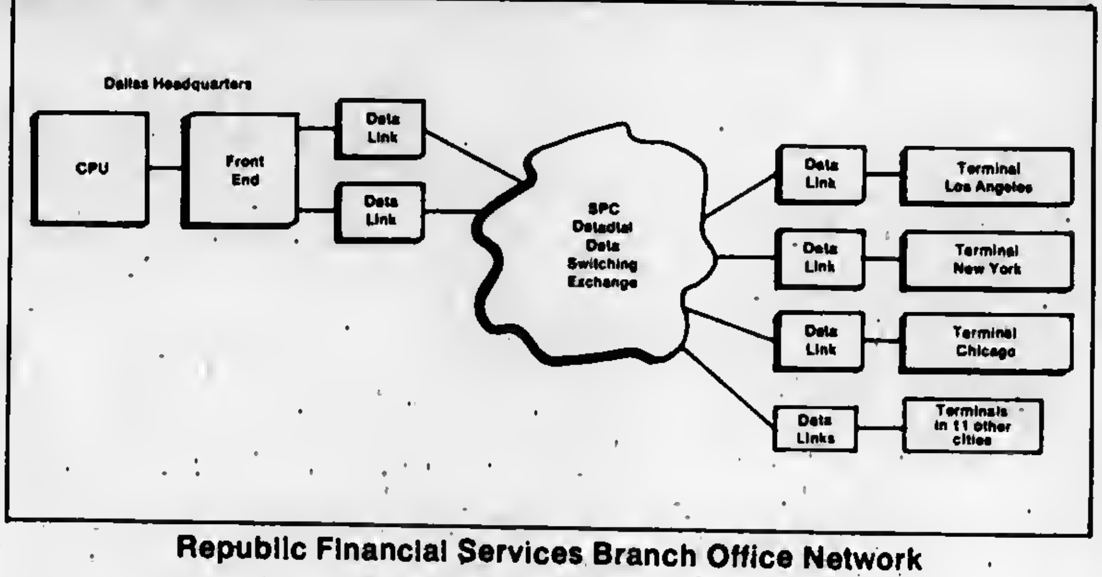
SPC's Datadial Connects Insurance Firm Branches



Republic Financial Services Branch Office Network

A Dallas-based insurance holding company, Republic Financial Services, Inc., is linked to Southern Pacific Communications' (SPC) Datadial network.

Datadial, SPC's dial-up, computer-controlled, circuit-switched digital transmission system, allows Republic Financial's branches across the country to communicate with the parent firm's computer in Dallas.

Donald K. Eisan, Republic Financial vice-president in chage of DP services, said his company was not always connected to SPC's network.

"We remained with Datran right up to their bankruptcy," said Eisan. "And then we were forced to hook up with the Bell System. Datran's network was far superior to AT&T Lines."

That's the main reason Eisan switched to SPC. SPC had purchased Datran's assets in October 1976, brought the system back on-line and further refined it in early 1977.

Republic Financial uses SPC's network to allow branch terminals in 17 cities across the country to communicate with the mainframe in Dallas. Branch locations in such cities as Detroit, Atlanta and San Diego enter new insurance applications into their local Datapoint 1153 terminals.

This is not an on-line application, Eisan noted. Rather, the Dallas Datapoint 5500 computer calls each branch terminal on a scheduled basis nightly and the terminal transmits insurance applications over Datadial at the present rate of 2,400 bit/sec. Computer connect time is less than one second and a typical call lasts about one to two minutes.

Each night in Dallas, the computer processes the applications. The computer then calls the appropriate branch terminal on SPC's network and transmits a completed insurance policy, which is then printed out on the 1153's. The next morning, the insurance policies are mailed out to Republic Financial customers.

"The Datadial system gives me digital reliability, usage-sensitive pricing and the flexibility to make network changes," Eison said. "We have a program under way now to upgrade some remote sites to 4,800 bit/sec."

For example, as the network expands and remotes are added, there is no need to reconfigure a multipoint/multidrop network. Each new branch installs another Datalink, the on-site equipment through which the user interfaces with the Datadial network. These same Datalinks can be added to the host computer to provide more ports.

Datadial has some advantages over DDD and Wats, Eisan pointed out. The older DDD network facilities are primarily designed for voice transmission and usually take 11 to 17 seconds to connect to the desired party. Datadial is geared to pure data transmission with a 0.8 second connect time and can operate at 9,600 bit/sec.

"Republic Financial was anxious to get back on Datadial's service. We do receive both improved transmission rate and quality of service," Eisan added.

The Series 21™ family of distributed processing systems from Mohawk Data Sciences installs easily to replace keypunches, key-tapes, key-disk systems and remote batch terminals, and expands just as easily to provide more power and flexibility in performance than any of those devices, for these ten reasons:

1. **Low Cost.** Series 21 prices begin at less than $115 per operator station per month.* That's as much as 50 percent below some competing systems.

2. **Reliability.** We've tested Series 21 for more than 30,000 hours, or the equivalent of ten years of use. That includes an entire week of "burn-in" for every integrated circuit we use — at extended temperature. We engineered Series 21 to work the way you need it to perform.

3. **Two-level Software.** With Series 21, you can begin source data entry without programming, or with it. Choose the Formatted Data Entry Program (FDEP) for productivity within hours after installation, or choose full programmability under MOBOL™ (Mohawk's Business-Oriented Language) for more sophisticated editing, file handling or local processing.

4. **Ease of Installation.** Series 21 systems can be installed practically anywhere, within minutes. The processor, memory and peripheral and communications control boards are all contained within a unit smaller than many office copiers. Operator stations are as portable as electric typewriters.

5. **Expandability.** As your distributed processing requirements grow, you can plug in additional operator stations, add printers or tape drives, or link Series 21 directly to large clustered data entry/communications systems from MDS™.

6. **Storage Hierarchy.** Series 21 handles from one to four diskette storage devices compatible with Basic Data Exchange (BDE) formats. Disks and tape drives can be added to System 21/40 to provide greater capacity.

7. **Flexible Communications.** Series 21 users can implement remote batch communications under binary synchronous or SDLC protocol, and can expand from BSC to SDLC with existing equipment.

8. **Large Display Screen.** A 15-inch CRT display is standard on all Series 21 systems, and you can choose 480 or 1920 character screen displays. Characters are displayed in 7x9 dot matrix in green on green phosphor behind a non-glare screen.

9. **Operator-Oriented Keyboards.** Data entry or typewriter keyboard layouts are available, and more than a dozen programmable function keys are standard on all Series 21 operator stations. Each station features full CRT cursor control via the operator keyboard. Other keyboard features include "N" key rollover, moveable keyboard and optional numeric pad.

10. **Worldwide Maintenance Support.** Mohawk Data Sciences has one of the largest sales and service organizations in the computer industry, with more than 2,500 employees in over 300 offices, worldwide.

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Data Net Gives Firm Central Financial Control

DALLAS — Do you know the old saying about not being able to have your cake and eat it too? OKC Corp. found an exception to that rule when it established a data terminal network linking its operations in four states to its headquarters here, according to Jim Fajack.

"We were at a dilemma," the OKC vice-president-finance recalled. "Corporate management needed current information for making timely financial decisions. At the same time, we believed it was important for our field sales personnel to be in control of data entry and invoicing. This gave them a way to be sensitive and responsive to customer needs. They were also in a better position for spotting invoicing errors."

OKC, with nearly $170 million in annual sales, has crude oil purchasing and refining, cement plans and dredging operations in Texas, Louisiana, Oklahoma and Florida.

Four NCR 7200 data terminals were installed at sales offices and two others at the corporate office. The terminals are used to enter bills of lading and other sales data. The information is collected on cassette for transmission by leased telephone lines to an NCR Criterion 8550 system at corporate headquarters.

Data for printing invoices is returned to the field offices via the same terminal-phone link-up. NCR 64-40 matrix printers in the field offices are used for generating hard copies.

"Before we adopted this system in 1976, it wasn't unusual for some locations to be one to 1-1/2 weeks behind in processing invoices," according to DP manager Charles Galloway. "That hurt cash flow. Statements often weren't completed until the 15th of the following month. Credit managers didn't have access to up-to-date status and accounts receivable agings. In fact, a credit manager might not know the status of an individual account until 20 days after the books were closed," he said.

Now, invoices always are mailed the same day the billing information is received, he continued. The quickest turnaround time has been about seven minutes.

Sales Trends Spotted

More complete and timely sales information has been a major boost to sales and production managers, Fajack added.

"We can see sales trends as they are being established and adjust refinery production activities throughout the month," the vice-president said.

"In our cement group, sales managers now have daily sales reports. Before, individual salesmen might have had a hip-pocket notion of sales on a day-to-day basis, but the sales managers were in the dark. Now the managers can keep a close watch on sales netbacks and follow up quickly with salesmen."

Cement sales are made F.O.B.-customer location, so transportation charges must be backed out of bills to obtain an accurate sales and profit picture, Fajack explained. OKC adapted NCR's ARC accounts receivable software.

"If we had tried to develop a system of this magnitude from scratch, it would have taken months of programming effort, and, even then, it wouldn't have been as elaborate," Galloway said.

Automation of accounts receivable has helped improve credit operations. A credit manager can ask for an aged analysis of accounts at any time. Past due statements, as well as invoices, go out on time, and payments are prompter. Billing errors have been reduced, too, he noted.

"We are able to obtain an aged trial balance of accounts receivable within two to three working days of month-end closings," Fajack said.

OKC was able to cost-justify purchasing the NCR Criterion computer and data terminal network on the basis of one application — oil lease royalty accounting. Previously this large DP job was handled by a computer service company and costs were climbing.

"Our ability to automate the other accounting functions, which were entirely manual before, has all been cost-justified by hard dollar savings in oil lease royalty accounting," Galloway said.

(Continued on Page S/24)

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Links Software, Data Bases

National Network Serves Needs of Universities

By James C. Emery
Special to CW

A national computing network has been established to serve the needs of colleges and universities. Called Edunet, the network links computers at participating institutions and permits faculty, students and administrators to share the variety of computer software and data bases that exists at computer centers within educational institutions.

The computer has become an important factor in higher education. An increasing number of students receive some form of computer assisted instruction and use the computer in their daily assignments. Faculty members need the computer to support their research as well as adding richness to their instructional material.

Librarians look to the computer to aid them in day-to-day operations and, increasingly, in retrieving information from bibliographic data bases. Administrators depend on the computer to perform a variety of DP and management functions. Indeed, colleges and universities could scarcely exist in their present form without the computer.

All of this has come at a significant cost. Although the fantastic advances in microelectronics have sharply reduced the hardware costs of computing, personnel costs have continued to escalate and are now the dominant cost component. This also stimulated a growing interest in the sharing of computing resources within higher education as a way of partially containing increasing costs.

No institution — not even the strongest and most financially secure — can afford to provide the wide range of computing services desired by its members solely from its own internal resources. The choice must be either a serious restriction on the variety of services that can be provided internally or, alternatively, the purchase of services from outside the institution.

This is not a new notion. State and regional computing networks supporting higher education have been around for a number of years, and they continue to play an exceedingly useful role. Arpanet pioneered in serving an important segment of the research community. Commercial firms are increasingly providing valuable specialized services such as bibliographic search and retrieval. The continued growth in this traffic testifies to the value of networks in meeting the needs of education and research.

Something for Everyone

Edunet does, however, provide a new capability. By serving the national higher educational community, Edunet makes it possible for any student, faculty member, researcher or administrator to gain access to the best computing resources available anywhere in the country. Edunet is not restricted to a limited subset of the community, but rather is designed to serve the computing needs of everyone who could benefit from access to specialized resources.

Edunet was developed by Educom, a Princeton, N.J.-based nonprofit organization founded in 1964 to promote resource sharing in higher education. The new network grew out of a series of three invited seminars sponsored by the National Science Foundation in the winter of 1972-73 to explore the possibility of establishing a national computing network for colleges and universities.

Over 150 leading educators and computer scientists who participated in the discussions concluded that a national network was desirable enough that its feasibility should be explored in more detail.

As a result, the Planning Council on Computing in Education and Research was organized as an activity of Educom in the summer of 1974. The council now consists of 22 major universities,

(Continued on Page S/25)

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Clearinghouse Handles Stock Transactions

(Continued from Page S/17)

in its own additional equipment and staff. For example, OCC sends print-image tapes of reports required by New York-based member firms to Securities Industries Automation Corp. (Siac), a service bureau that handles processing for the New York and American Stock Exchanges.

New York is OCC's largest volume branch office with roughly 325,000 records transmitted to and from daily. Two of the eight System 2400s in OCC's communications network are located at Siac to further streamline the flow of data between New York and Chicago. Siac receives Amex trades from member firms, runs its trade matching system and transmits the resulting matched trade tape to OCC via the 56 kbit/sec data link for clearinghouse processing.

Utilizing a data compression feature of the MDS software, OCC is able to reduce the number of bits transmitted in any given batch by at least 30%. The compression takes place automatically during transmission.

Daily Traffic

"We transmit roughly 550,000-plus records daily among our five locations," Pecot said. "Each record averages 144 output bytes. Matched tapes from the exchanges are transmitted to us daily by 9 p.m. and we guarantee processed reports by 8 a.m. the next day. In that kind of time-critical, high-volume environment, we had to have the ability to compress data, generate print-image tapes and communicate at the 56 kbit/sec rate. MDS was the only vendor with an 'off-the-shelf' compression package capable of handling high-speed 56 kbit/sec lines. Those features were the major reasons we selected MDS over other vendors of data communications equipment," he said.

"MDS was the only vendor who could really offer us the entire tape-to-tape communication system we needed," he added. Others could have supported the 56 kbit/sec speed, but would have required on-line transmission and resulted in unacceptable software overhead on the mainframe."

OCC is currently considering adding data entry terminals to its existing System 2400s for use during regular business hours. "We are beginning to look at ways to utilize the equipment's capacity to handle data entry and communications concurrently," Pecot said, "now that we've solved the problem of how to keep up with our growing communications volume."

Net Provides CPU Control Of Accounts

(Continued from Page S/22)

"Royalty income on a single lease may have to be divided among 500 interest owners. Legal requirements on record-keeping and payments are stringent. We issue between 3,500 and 4,000 interest checks each month, as well as generating reports for federal and state tax purposes.

Automation Underway

OKC's five-person DP department has automated accounts receivable, invoicing and plant payrolls during its first year. Now the staff is launching a total data base system with B-3 multiprogramming capabilities. By year-end 1978, OKC expects to have all general accounting functions on the computer.

While management is happy with the faster cash flow, Fajack said more important improvements are just over the horizon.

Pipeline Terminus

OKC is the southern-most terminus for a common carrier pipeline that distributes refined oil products to customers throughout the Midwest. When OKC's products are sold up the line, several days may pass between the sale date and OKC's receipt of the bill of lading information. That means invoices often aren't mailed until three to seven days after a sale. And the value of a single invoice can exceed $1 million, he explained.

There isn't a single single-
that can touch Tandem in

To begin with, we're twice as good. With multiple processors. It's as simple as this. On-line means on-demand, and one processor won't do. Because any processor, even one of ours, can fail. And if that failure occurs during a peak period of transactions, you're out of business while it's down. And out of luck if you miss your re-start point or clobber your data base. And out of control if you lose or duplicate the transactions in process when the failure occurs.

You need a NonStop™ System.

Tandem has built the world's first multiple processor system, designed from scratch in both hardware and software, to provide non-stop processing—even during a failure—with no penalties in the speed, capacity, throughput or memory utilization of the system.

And it can grow without penalty. Starting with a basic two processor system, users can add processors, memory or terminals incrementally all the way to a fully expanded system of sixteen processors supporting 2048 data communications lines, with individual files of up to four billion bytes fully supported by a comprehensive data base management system. But the best part is that you never have to reprogram. Ever. Your Tandem NonStop System just gets bigger and better. At remarkably low cost.

Why the big ones fail.

The big mainframes are expensive to begin with. And even they can fail. Which can leave you high and dry in the on-line environment. But there are other difficulties with the big numbers, too. Of prime consideration in the on-line world, they offer very limited throughput for their price. And by the time you've hung a lot of communications lines on them, they suffer a derating which makes their performance even less attractive.

And whereas you may eventually need that kind of horsepower in your on-line system, chances are it's an expensive overkill at the outset, What you need is a system which will do the job efficiently on the way in, and grow as your needs grow, in modest price increments. It makes the big systems people wish they were more flexible.

One mini just won't make it.

Minis have made a name for themselves, justifiably. But in the world of on-line, where needs keep growing, the one mini system just can't cut it. With the architectural limitations inherent to a single mini system. growth can build system overhead so fast you'll grind to a halt before you know it.

And strap-ups will kill you.

The answer might seem to be to strap two processors together. One goes down, and the other takes over. Right? Wrong. It's not that simple. System software for a single processor system won't run on the strap-ups. And the fate of any transactions-in-process at the time of a failure is unknown. As is the state of any records being updated. And growth beyond the original system capacity is well nigh impossible.

What you really need is the one multiple processor system designed for multiple processor operation. Tandem's NonStop System.

The four major "on-line" considerations.

When anyone is considering an on-line system, regardless of size, there are four primary points to consider. Throughput. Availability. Data Integrity. Transaction Protection. The system must be able to handle the job. It must be there when you need it. You must be sure of the integrity of your data base. And you must be sure you don't lose or duplicate a transaction. Even during a failure. No single processor system anywhere can provide that assurance. It takes a multiple processor system designed for the on-line environment, and Tandem is it.

For better throughput, spread the files.

We built the Tandem NonStop System with geographic independence of programs and files. They're handled automatically under Enscribe, our Data Base Record Manager. And instead of having one processor with one bottlenecking channel and a

The Tandem 16 NonStop System is composed of multiple, independent processors with dual redundant communications paths. The unique interaction between Tandem hardware and software assures not only continuous operation, and the integrity of your data base, but also throughput unmatched by any other computing system of comparable cost.

Ten Participating Institutions

Edunet Links Data Bases at Different Colleges

(Continued from Page S/23)

both public and private, in all parts of the country.

With significant financial support from its members, supplemented by aid from the Carnegie Corp., the Exxon Education Foundation and the Ford Foundation, the council set out to plan for and implement a national network.

The resulting network consists of three major components. First, there are the autonomous computer centers at universities that are willing to sell services to remote users at educational institutions and nonprofit research organizations.

Each center establishes the list of services it wishes to support and sets the prices it wishes to charge. Edunet currently has 10 such computer center suppliers — at Dartmouth College, MIT, Yale University, State University of New York at Albany, the Triangle Universities Computer Center in North Carolina, the Universities of Minnesota and Wisconsin, Rice University, Stanford University and the University of California. Together they offer a wide source of unique programs and specialized data bases on a variety of hardware.

Second Component

The second component of the network is the communication link that connects the remote user to one of the supplying computer centers. It was decided at an early stage to rely on a commercial common carrier for these communication services rather than using dedicated leased lines.

This strategy not only avoids the tremendous fixed costs of maintaining leased lines, but it also makes it possible to reach a much more broadly dispersed group of users and suppliers than would ever be possible with dedicated lines. After a review of the alternatives, Edunet decided to use Telenet as its principal communication vendor.

The third component of the network is the "facilitating" service that makes resource sharing possible. In order for users to access a remote computer, they must find out which computer center offers a desired service, how the service can be used, whom they can call for assistance, how they can become authorized to use the computer and how they can pay for the services they receive.

Variety of Services

The network offers a variety of facilitating services to aid such users. It maintains an on-line directory, located at the Stanford University computer center, which contains information about services available and the means of accessing them. It publishes a newsletter which describes network activities and services. It maintains a "hot line" with a toll-free number — 800-257-9505 — through which a prospective user at a university can obtain person-to-person assistance in locating desired services or dealing with a network problem.

Since Edunet was established only recently, its traffic is still quite limited. Even when mature, the network is likely to serve only a relatively small fraction of the computing needs of the higher educational community; the bulk of these needs will still be served locally by a campus computer or even a personal microcomputer.

However, in many cases, the specialized programs or data bases available could not otherwise be provided at a reasonable cost. Some institutions may even be willing to rely on the network for all of their computing, but most will probably choose to supply the majority of their own services and look to the network only to obtain specialized services.

A number of institutions may also want to sell services to other network users, and thereby earn revenues that can offset their own purchases of computing services.

Emory is president of Educom.

processor system anywhere an "on line" environment.

fixed priority system, Tandem's NonStop System distributes the work and the files across multiple processors, multiple discs, and multiple channels. Enscribe controls the pattern and the flow for maximum efficiency. Because of simultaneous disc accesses, there's a dramatic improvement in response time. It's one of the performance benefits about a multiple processor system which you can't get on a single processor system.

Ease of programming, by design.

Historically, multiple processor systems have been a bear to program. Not with Tandem. Guardian, Tandem's operating system, lets you write your programs as usual. You can add more processors, or memory, or terminals as you need them. No need to rewrite programs. Ever.

And we make it easy to write the programs in the first place, with COBOL or with TAL, a powerful language designed for fast, flexible programming. The software development tools of this mini-based system rival those of far more expensive systems, and include NonStop operation, data communications, mirror volume capability, full file protection, screen formatting programs, and a host of housekeeping utilities.

When you're thinking "on-line," think in Tandem.

Which means think in multiples. Few, if any, "on-line" systems can be installed and forgotten. The number of transactions, the number of terminals on-line, or the number of applications programs to be run on the system keep growing. Most likely, all three will multiply.

Which is traumatic unless you've started with the one system on the market which can grow with you—even if the growth occurs during the initial configuration phase—without having to start all over again.

NonStop growth and NonStop protection, too.

Because the Tandem System was designed for NonStop operation in both hardware and software, it offers an extraordinary measure of protection against a failure in any processor, I/O channel, disc drive, or in the software. No other system offers this measure of assurance.

When a failure does occur in any segment of the system, its back-up counterpart completes the task, without a hitch. Since all programs are geographically independent, and the operating system both distributes and monitors all work-in-process, recovery from a failure is instantaneous. There is no restart; no backing up to a hopefully safe point.

The system monitors its own operations, performing all tasks in a distributed fashion across the multiple processors. Even when a CPU goes down, another CPU is immediately aware of the failure and picks up the task in process and completes it. No data and no transaction need ever be lost or duplicated. The integrity of the data base can be fully protected. It is truly unusual, but it's one reason why we say no single processor system anywhere can touch us in the "on-line" environment.

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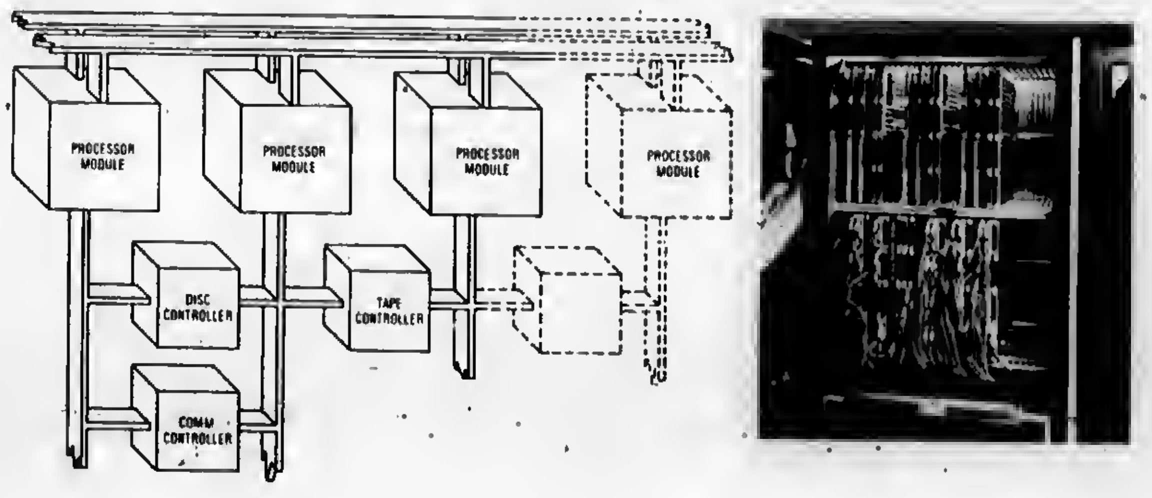
Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.



Shared Insurance Net Feasible, Cost-Effective

(Continued from Page S/3)

Seven basic studies went into the formulation of an optimized system. They were:

- Single company agent-field office communication alternatives (interactive agent office, batch agent office, nonautomated agent office).
- Integrated system, that is insurance companies sharing a network vs. individual company networks.
- Effect of level of agent participation on integrated system cost.
- Effect of level of company participation on integrated system cost.
- Effect of total transaction level on integrated system cost.
- Effect of terminal compatibility on integrated system cost.
- Backbone network alternatives for an integrated system.

Several interesting general observations emerged from these studies. For one, the cost of any total system, single company or integrated, appears to be dominated by the agent (terminal and communications) costs. In turn, the termial cost is usually larger than the communications cost. This is particularly true for an integrated system. Most of the local access cost is incurred on connections from the concentrators or multiplexers. The cost for connections from the terminals to concentrators or multiplexers to backbone switches is a small portion of the total local access cost.

The optimum design is a packet switch backbone network involving 14 switching centers and all 10,000 agents. The overall network structure is shown in Figure 1. The computer plotted network, shown as Figure 2, is completely compatible with both present and anticipated traffic volume requirements. It has the advantages of using shared lines for local access and using a highly reliable and flexible backbone network in order to achieve economies of scale for long-distance communication.

Other Options

Other options are possible. For example, it is feasible to use a central switch controlling all traffic on a nationwide basis. However, there is an immense risk in terms of reliability for such a system and a large initial cost for construction of the central switch, even though it carries a minimal amount of traffic.

Circuit switching is also possible, but is rather high in cost and resonse time for interactive traffic. It is possible to use a value-added network such as Telenet and we did indeed evaluate this alternative. Networks without any switching are also possible. However, these entail a great sacrifice in terms of flexibility and adaptability to traffic variations.

Using the network shown in Figure 2 and analyzing the resulting costs for seven different configurations, as shown in Table 1, the total cost for transmitting 1,000 characters through the various network alternatives varies from 6 cents to 16.8 cents. Studying these figures, which were derived from NAC's data base containing tariff rates for the entire country, we were able to establish the following conclusions:

Cost Conclusions

- With all 10,000 agents in the data base included in the system, the total communication cost for the separate company networks is approximately four times that of the integrated system; that is, $6.5 million/mo as opposed to $1.66 million/mo.
- This cost ratio varies by only 15% for up to a 50% change in the unit transmission costs and in the unit hardware costs. This implies that the cost savings in the integrated system is achieved mainly from economies of scale and better resource utilization through sharing of facilities. It is relatively independent of the particular cost structure employed.
- Computer terminal incompatibility has only a marginal effect on the total integrated system cost.
- With the top five insurance companies excluded from the integrated system, the communications cost per unit of traffic increases approximately 40%. Thus, the participation of the "giants" in the integration effort is important, but not an absolute necessity.

Telenet Higher

- The total communication cost of using Telenet as the backbone network is approximately 35% higher than that of implementing a private packet switched backbone network.
- The communications cost for an agent was found to be approximately $113/mo, with less than 10% variation for a range of 2,500 to 10,000 agents participating. This cost was derived by first defining the communications cost for an integrated system that does not include agents to be the communications cost for the companies. Then, the agents' cost was estimated from a system that also includes the agents.

Our study is quite clear in indicating that, over a broad range of requirements, user population and tariff structures, an integrated network promises to yield major benefits for agencies and companies at significantly reduced communications costs. Such a network could be readily implemented with proven technology bringing both financial and organizational benefits to both the insurance companies and their associated independent agents.

Frisch is senior vice-president and Hsieh is a member of the technical staff at Network Analysis Corp., Glen Cove, N.Y.

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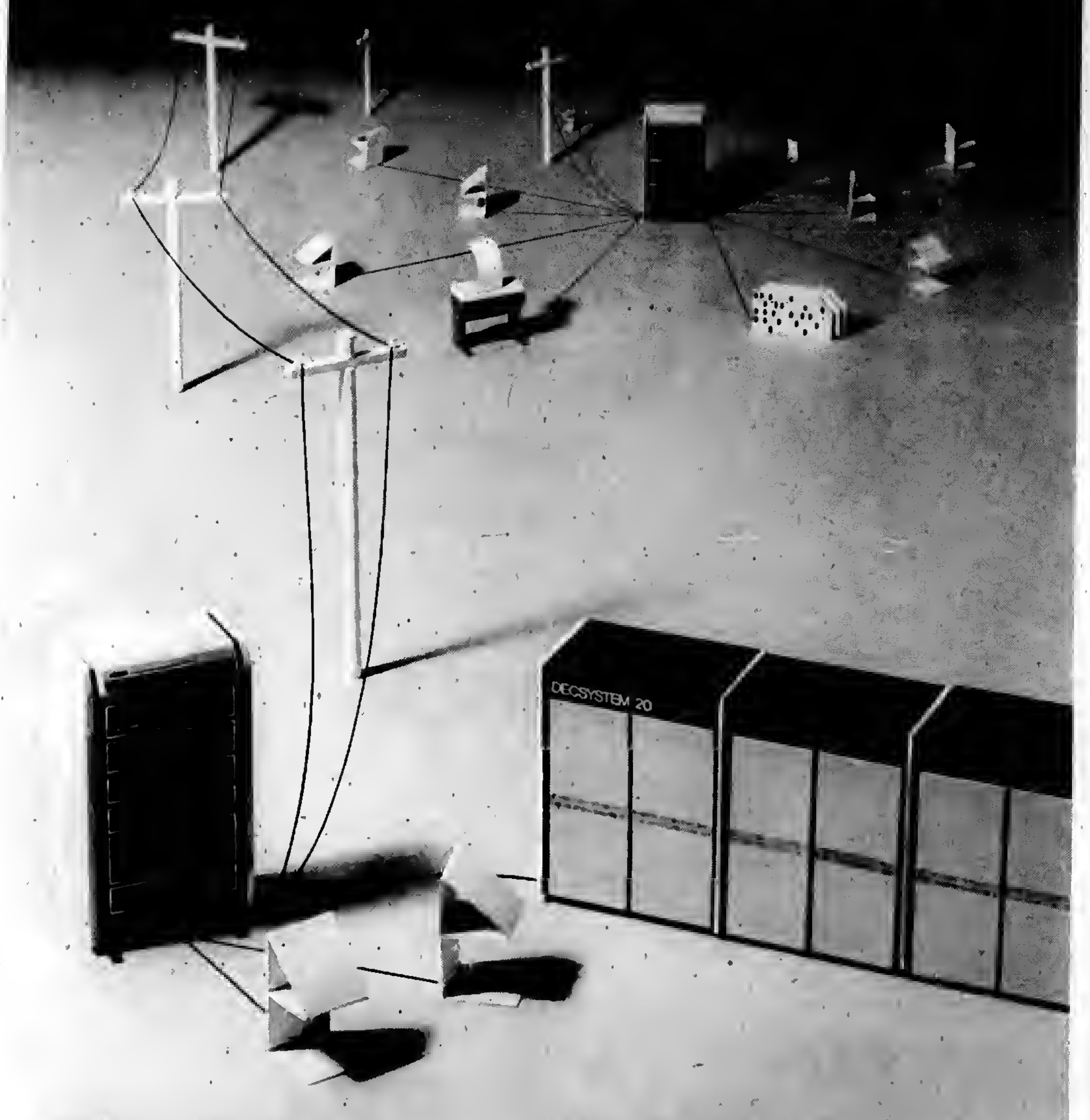

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Improve Data Gathering

Multiplexers Reduce Credit Net Hookup Costs

Special to CW

The intelligent selection of data communications products can help local credit bureaus dramatically reduce their leased-line telephone costs while saving time through immediate, computerized reporting. One credit bureau executive stated he estimates 20% to 25% of end users nationwide currently have automated credit reports (with the rest using written and verbal reports), but he would like to see the automated share rise to between 50% and 65%.

Spurring automated credit reporting are the trends toward more rapid and frequent transportation (consumer "mobility"), the growth of major credit-granting retail firms and the increase in the exchange of data between credit bureaus.

An example of the latter was the agreement last summer to link up the computerized credit networks of Chicago's Trans Union Systems Corp. (TU) and Dallas-based Chilton Corp. in a message system called "Credinet," which, when fully operational this fall, will connect credit bureaus serving about 40% of U.S. consumers. Rounding out the "Big Five" credit networks are Pinger in Houston, TRW in Anaheim, Calif., and Credit Bureaus, Inc. (CBI) in Atlanta.

This piece will discuss some of the problems inherent in a data communications network, describe the architecture of one of the "Big Five" systems, and finally, explain how frequency division multiplexers (FDMs) produced a dramatic reduction in leased phone costs for the Merchants Association of Bakersfield (Calif.).

Because data communications is the most visible part of the total data structure, it's always blamed when something goes wrong. It's the umbilical cord to a computer. You can break it by bringing the computer to you — or you can strengthen it and reduce the cost of that link by adding modems, multiplexers or line drivers.

End-User Neglect

Another data communications problem is that of end-user neglect. Granted, the huge nationwide credit networks have design expertise and state-of-the-art equipment and they know all the tricks for getting cost breaks on leased telephone lines. However, what they don't do — and should — is pass on these cost-effective-techniques to end-users.

It is distressing that the end user is often neglected this way. Often, when end users want to interface to these networks, there's no one there to show them how to do it cost effectively.

TU's network is based in Chicago. The firm has a tremendous data base that serves 64 cities, stores credit information on 54 million households and supports more than 1,000 points of access to the host computers — two IBM 370/158s. Supporting the mainframes are an OS-MV operating system; IBM 3350 disk storage system and CICS communications software.

The average household data base for TU's system consists of seven "pages" of information, with each page containing 240 8-bit bytes of data. The mammoth system, which generates about 12,000 credit reports per hour (one billable transaction equals seven pages), recently set a record when it processed 87,000 transactions in one 16-hour day.

Radiating from TU's Chicago base are various "nodes" — actually minicomputer-based relay stations — located throughout the country, such as the one in Visalia, Calif., center for the Credit Bureaus of Tulare County.

Visalia Node

The Visalia node, using Raytheon Data Systems Co.'s "PTS" minicomputer, can handle about 24 data channels in the 300 bit/sec range, plus a cluster of CRTs (up to 16) running at 48 bit/sec and a 300 line/min printer. The Raytheon "PTS" mini emulates IBM's 2848/2260 system and has buffers for 20 teletypewriters.

This node allows the Tulare County system to fully automate every aspect of credit reporting — verification, collection, employment data and ratings. But, what about the users, those who rely on these bureaus for credit information — the large retail stores, the small specialty shops, the catalog stores? How do they get the data they need?

Often, they have to rely on written reports from a bureau, which involve a costly and very slow process. One of the alternatives is to have dial-up modems located at the node that can be accessed remotely from various retail outlets requesting credit data.

(Continued on Page S/38)

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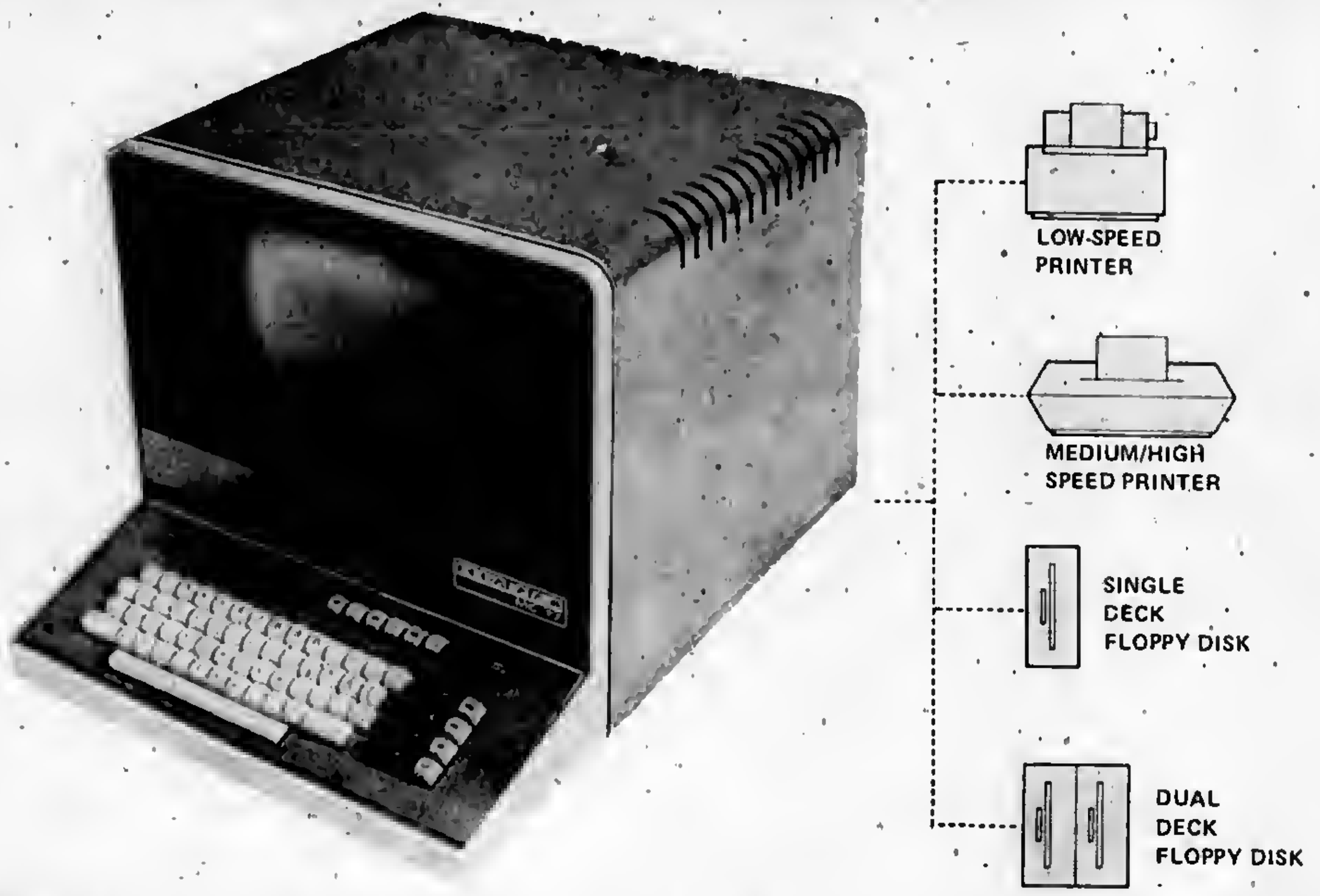

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Intelligent TDMs Enhance Network Utilization

(Continued from Page S/4)

The network traffic statistics must be monitored very closely when statistical multiplexing is used. If traffic activity forces a channel to wait for "space" on the high-speed aggregate data stream for a period longer than the buffer length assigned to the channel, then subsequent data is lost. This potential blocking characteristic is reduced either by extending channel buffer lengths, increasing the high-speed aggregate data rate or by reducing the number of circuits that have access to the statistical multiplexer.

Data Compaction

Data compaction multiplexers gain their efficiency through the statistics of language usage. This technique can be very efficient for a very specific language usage application, since the more frequent characters are assigned few signaling elements and the infrequent use characters are assigned the code words, where the number of signaling elements is roughly in inverse proportion to their frequency of use.

The very characteristic which makes a code set very efficient for a specific language application can make it very inefficient for another application. For instance, a code set intended for English language text transmission can be very inefficient for transmission of numerical data (as is the case with Morse code).

In order to maintain a high level of efficiency, the terminal code set (such as Ascii) is abbreviated when converted to the data compaction code set for transmission. The efficiency is therefore obtained at the sacrifice of data transparency.

The data compaction characters define, in their bit sequence, their own termination. This is necessary in order to determine if a sequence of say 10 bits represents one 10-bit character from one channel, two five-bit characters from two different channels or perhaps two three-bit characters and one four-bit character from three different channels.

As such, a bit error in one data compaction character destroys the identity of its termination, and this loss of character synchronization is permeated through succeeding characters of other channels. Eventually, a true character ending is recognized and character synchronization is restored.

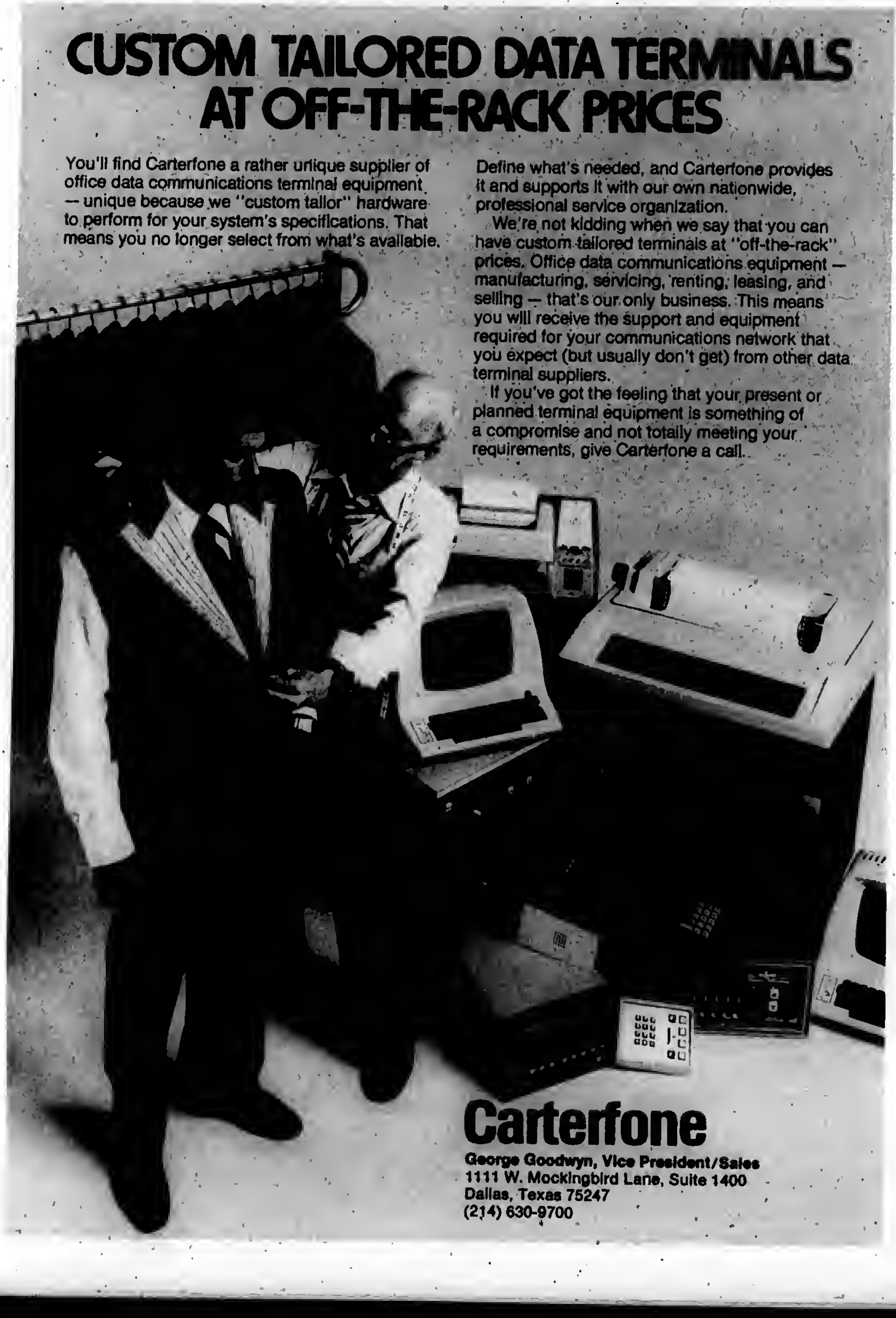
This error multiplying characteristic dictates that data compaction multiplexers operate with a highly sophisticated error protection scheme. Indeed, to operate without error protection is to invite disaster.

The data compaction channels will, when the code is properly matched to the language usage, utilize a proportion of the high-speed aggregate data stream which is on the average less than the overall circuit data rate, which is, or course, the objective of data compaction. The instantaneous proportion will vary above and below this average depending on the specific character transmitted. The minimum bandwidth is utilized when there is no data on the channel and only the terminator for that channel is transmitted.

By the same token, data compaction will, like statistical multiplexing, exhibit variable propagation delays during periods of high network activity. It is also susceptible to blockage if the data activity of its channels exceeds the capability of its buffers to bridge the transmission delays encountered.

With the intelligent TDMs, the communications manager has three multiplexing techniques available to him, all of which offer significantly higher levels of network utilization than is possible with hard-wired TDMs. It is therefore incumbent upon him to look deeper into the operating characteristics and traffic patterns of his data communications services. He can then weigh the advantages and disadvantages of the multiplexing techniques.

John M. O'Neil is product line manger at General DataComm Industries, Wilton, Conn. 06897.



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CCITT Codifies Multiplex Plans

(Continued from Page S/8)

media to the central site, where all the channels are demultiplexed, thereby significantly reducing line costs.

Figure 2 illustrates the use of such a TDM element in a combined data/-telex network. Telex subscribers at site 2 can communicate through the Telex switch with other Telex subscribers or with the four Telex computer ports available.

The three 1,200 bits/sec terminals at site 1 are demultiplexed at the central site after utilizing the bypass feature at site 2. They are fed directly into the computer, as are two 1,200 bits/sec terminals at site 2 and all the terminals at site 3. The TDMs in effect remote the ports of the Telex switch and the central computer, while saving transmission costs by multiplexing data streams.

The appearance of TDM network elements of this type have had a strong influence on the efforts of the CCITT to establish new standards and protocols for data/Telex transmission. With these new emerging protocols it is likely that data/Telex networks of the near future will have additional capabilities, incuding interaction with the packet carriers [CW, Oct. 24].

Popovici is manager of networks design at Timeplex, Inc., Hackensack, N.J.

Terminal-Based System

Small Town Monitors Utilities Consumption

ASHLAND, Neb. — Halfway between Omaha and Lincoln, a small midwestern town is making quiet history. Ashland, Neb., is the successful proving ground for the first phase of the exciting commercial technology of load management. Gas, electricity and water are monitored automatically by a terminal-based management system.

The system, designed by Darco, Inc., makes use of existing public equipment, in some cases totally eliminating new design and manufacturing costs. The terminals used are the Texas Instruments Silent 700 Model 743 KSR units, which serve as operator interfaces for evaluation of errors, system tampering and utilities close-outs.

Before the Ashland project, meter readers were still cheaper to use than automatic systems. Now meters are outfitted with tiny encoders that are substituted for the last rotating dial on the visual display.

As the encoder turns, magnetic impulses are generated and relayed to a hand-sized transponder. Each utility site monitors the many hundreds of consumers throughout town by silently calling their transponders via existing telephone lines.

In turn, the transponders transmit data back to Darco's 2K-byte central controller, which automatically records a customer identity code, meter readings and possible system tampering. If the line is busy during a reading, the controller makes a note of the number and automatically redials at a later time. Even though the subscriber phone lines are used as a system medium, in no way does the system controller interface with normal customer use.

The use of existing phone lines eliminates the need for costly new wiring or radio equipment. Meter modification and system hook-up costs are split three ways by the City of Ashland, Omaha Public Power District and People's Natural Gas, the serving companies. Reading costs, billing time and errors are reduced, and hourly monitoring through the terminals establishes user patterns that are charted to estimate peak load periods of consumption.

A single controller and interfacing 743 terminal can handle many thousands of transponders, Darco said. This feature makes the system well-suited to large-scale use. Further costs are cut when the system is used to determine time of day readings for peak loads, since traditional dual register meters are not required.

Direct Control

Direct control over utilities would allow the serving companies to immediately shut down and bill departing customers and to activate gas, water and electricity for incoming tenants. During peak load periods, energy users may be charged premium rates, whereas users who defer their needs until minimum periods may be rewarded with lower rates.

Darco's vice-president, Frank L. Ashford, pointed out system benefits that are particularly attractive to cities: Consumers are secure from criminals posing as meter readers, and utilities thefts are minimized since possible system tampering is automatically logged by the controller.

The constant turnover of tenants in high-rise structures can be monitored by the individual utilities companies when consumption stops, and occupancy by new tenants is indicated by reactivation of their utilities. In addition, user trends may be graphed to efficiently plan city energy development programs.

DDP Adaptable To Central Nets

(Continued from Page S/6)

sages. These applications have different priority and timeliness requirements which cannot be handled by the traditional teleprocessing system.

Using QTH, the administrative message is entered off-line during normal working hours without using resources needed by high priority applications. The message is then transmitted during periods of low line or host usage. Thus, QTH achieves full utilization of terminal operators during working hours, balances the load on the network and host and provides timely allocation of resources to ensure appropriate application priorities.

LFS and QTH blend easily into existing teleprocessing systems whether the problem is to upgrade the capacity and the efficiency of an existing system or to add new network applications. In contrast with other concepts which may require a considerable investment to rebuild the basic system, LFS and QTH preserve and enhance the smoothly running systems already in place.

Implementing LFS and QTH with flexible and programmable terminal systems forms an ideal base from which to implement additional distributed processing functions as such functions are shown to be cost/-effective and operationally beneficial.

Alcorn is a system engineer at Harris Corp., Data Communications Division, Nashua, N.H.

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RJE Terminals Save Firestone Annual $100,000

AKRON, Ohio — To give its smaller offices the same computing power as its larger offices, Firestone Tire and Rubber Co. turned to remote job entry (RJE) terminals — and it's saving $100,000 per year.

Five years ago, however, divisions of Firestone had a different story to tell — in fact, 24 different stories. Because each office had its own unique requirements, each determined its own DP solution. Hence a smaller office chose to have no automated equipment while the larger facility opted for its own in-house computer.

"It was a very costly operation," according to Paul Kuntz, section manager for RJE processing. "At the same time that we were building a large-scale computer facility at headquarters, our offices were trying to update and enlarge their own facilities. It was simply a duplication of effort."

Besides the money that Firestone thought it could and did save by centralizing its operation, it also gave small divisions the same DP capabilities as large divisions.

So the company began to invest in RJE equipment, utilizing keypunch and key verify equipment designed to give the individual offices the power they needed, when they needed it, to perform their local DP tasks.

The equipment succeeded, but at a cost and not only a dollars and cents cost, either. There was also the cost of using one piece of equipment to perform only one function and, in the case of the 50 or so keypunches, being limited in editing capabilities.

"We wanted not only a key-to-disk facility," Kuntz explained, "but one that supported card equipment." The company also wanted a range of compatible equipment that would not overpower small divisions or shortchange large divisions. And it wanted it all from a single source, he said.

In September 1975, Firestone began installing its first Data 100 units. Twelve months later, the 24 systems representing 75 key entry visual display stations were installed in Firestone's remote locations. The assortment of multifunction terminal systems replaced competitive equipment including keypunches and assorted card equipment.

Better Editing

Cost savings is not the only benefit to Firestone, Kuntz noted. "Key-to-disk is a much better environment than keypunch," he said, "because we have significantly better editing capabilities."

Kuntz said he was also pleased with Data 100's Hasp 360 software, which supports a CRT console. "Not only does it allow us to condense the data so that transmission time is cut," he noted, "but since we can interleave data streams, we can transmit and receive print data simultaneously."

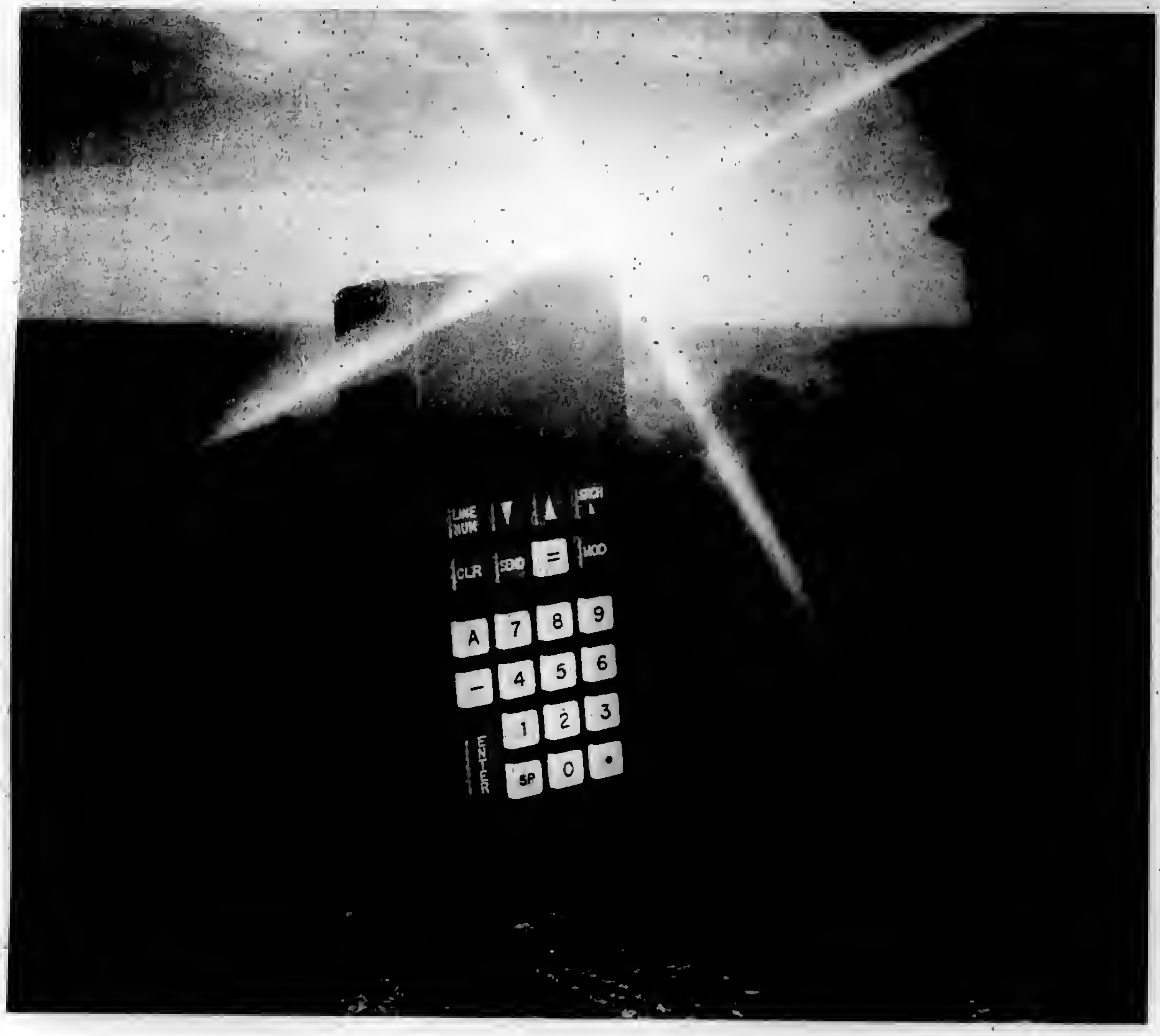
The new Firestone network ties all of the nearly 75 terminal operators at the 24 remote sites directly into the company's IBM 370/158 operating under MVS. That way, a division with three subsidiaries can draw the operating information it needs from its subsidiaries.

"At that point, when the CPU has totally edited the data," Kuntz said, "we know it is correct. It may cost us a little more to go through the central site," he conceded, "but the autonomy it buys the remote offices more than makes up for the difference."

The equipment was selected carefully — picking the power that matched the office's individual needs:

- One division now uses a Model 77 key-diskette system with a low-speed 125 line/min printer to generate 3,000 lines of print a month.
- Another division uses a Model 78 communicating Keybatch system with four CRTs and a 300 line/min printer to print 2 million lines of reports each month.
- Other divisions use a dual processor Model 78 Keybatch system with five CRTs and a 1,000 line/min printer to generate and print more than 8 million lines a month.

In all, Firestone has line printers ranging in speeds from 125 line/min to 1,000 line/min, a variety of magnetic tape drives, punches and readers and a range of transmission speeds from 2,400 bit/sec to 9,600 bit/sec.



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Point-of-Sale EFT Attracts Users, Cuts Costs

Special to CW

Electronic funds transfer systems (EFTS) seem to be going over well in the Buffalo, N.Y., area. Three competing EFTS point-of-sale networks are in operation in the metropolitan area, which has a population of about 1.7 million.

The latest of the three networks is Instacard, which is the trademark for a debit card system jointly owned by The Western New York Savings Bank and Niagara Permanent Savings and Loan Association. Between them, the two thrift institutions hold assets of $1.2 billion — a smaller total than institutions in either of the two competitive systems — but both saw growth in only the first three months of the system's operation.

Both institutions offer deposits and withdrawals from statement savings and regular checking accounts through retail terminals installed in Tops Friendly Markets stores, and the food store company uses the network to speed up its own in-store check-cashing services. Tops was selected as the retailer for one basic reason: More checks are cashed or cleared through Tops stores than through any single bank in the Buffalo area.

Kenneth W. Kerber, senior vice-president of Western New York Savings, and James D. Chase, senior executive vice-president of Niagara Permanent Savings and Loan, established objectives for the system during its design.

"We had three objectives," they said. "First was a hope to build new depositor relationships to bring in new deposit dollars. Second, we were looking to displace some of the costs of the traditional banking environment by putting some of the transactions into the stores. And third, because of the competition posed by the other two networks, we wanted to avoid losing our customer base to somebody elsewho's entered EFTS."

In the first nine months, the depositor relationship goal became evident. Kerber said that Western New York Savings can pinpoint approximately 9,000 new accounts with total balances in excess of $5 million as the result of the EFTS promotion. Chase reported comparable figures for Niagara Permanent.

Activity Building

Activity on the network started slowly but is gradually building, and by the end of 1977 — about a year after starting — it is estimated that the break-even point of 40,000 transactions a month will be reached. The nature of those transactions, however, is interesting to note. Deposits outnumber withdrawals by two to one; however, in terms of dollars, deposits are about five times as great as withdrawals.

This means that the network not only brought in new depositors, but also the activity is heavily in favor of new deposit dollars. "There has not been a single day when the dollar of deposits has not exceeded the dollar of withdrawals," Kerber noted, "including bank holidays."

From a different vantage, the statistics indicate that the number of transactions is about equally divided between statement savings and checking accounts. The dollar volume is lopsided in favor of checking accounts, however. About 40% of the dollar activity is in the statement savings area, and about 60% is in checking accounts.

In the first nine months, the institutions met their goal of attracting new depositors. Western New York Savings can pinpoint approximately 9,000 new accounts with total balances in excess of $5 million as a result of the EFTS promotion. Comparable figures were reported for Niagara Permanent Savings and Loan Association.

These encouraging figures are attributed to a couple of factors. One is that the competitive systems conditioned Buffalonians to the idea of banking at their supermarkets. The other is a spin-off of the blizzards of 1977 that inundated the city. "It made people realize they had banking facilities available nearby in a supermarket at a time when it would have been very difficult for them to get to a bank branch," Kerber recalled.

The card base has also been growing slowly but steadily, according to Leonard H. Knabelkamp, president of InstaCard Corp., which is the corporate entity established by the institutions to manage and promote the EFTS system. The project started with a zero card base, offering a separate card for each institution and a third card for the Tops organization to use as a check-cashing identification. There were about 40,000 retail check identification cards and some 9,000 cards out for the

(Continued on Page S/37)

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Public Packet Nets Expanding Overseas Service

(Continued from Page S/7)

At that point in time, in order to give international users access to computers on Telenet as well as those on Tymnet, Tymnet, Inc. provided a connection to Telenet from the international record carrier (IRC) nodes in the U.S. These connections took the form of asynchronous channels between the intelligent Tymsats and time-division multiplexers (TACs) that provide access to Telenet. The Telenet Mux looks like another host to Tymnet, but in effect provides terminal access to any of Telenet's customers' computers.

Next, RCA Global Communications, Inc. and Radio Suisse came to an agreement to install a Tymsat in Berne, Switzerland. It provides access to U.S. hosts with toll-free dialing from all cities in Switzerland. Most recently, similar agreements and Tymsat installations have been completed in Brussels, Belgium; Amsterdam, The Netherlands; and Frankfurt, Germany — with ITT, WUI and RCA respectively. The Spanish PTT has installed a Computer Transmission Corp. (Tran) multiplexer node that interconnects to WUI's Tymsat in New York.

Italcable ordered a Tymsat for installation in Rome as of mid-September. It will connect to all of the aforementioned IRCs, plus TRT Telecommunications, which is in the process of filing with the FCC for permission to interconnect with a circuit between Italcable and its Tymsat in one of its U.S. gateway cities.

Looking to the future, network users may expect beneficial changes and continued expansion internationally. New cities will be added as the IRCs finalize agreements with more foreign administrations. Hopefully, these new locations will include Japan, Sweden, Norway, Australia, The Philippines, Iran, Brazil and others.

Networks will appear and some equipment will change. TransCanada Telephone System now has the Datapac network in the early stages of operation. Public U.S. networks will ultimately connect to Datapac using X.25 protocol.

This will mean data service will be available from 54 Canadian locations. Both the UK and France will also have national networks and plan to change their Tymsats for gateway nodes that were in the overall plan long before the interconnection to the IRCs and Tymnet.

The value-added networks have proposed to interconnect to these gateway nodes using X7X protocol, now under development.

Presently, all traffic flow is between international terminals and domestic computers. Foreign hosts will be connected either to Tymnet nodes or data networks in other countries for access by U.S. terminals.

Finally, more features will be added to the service. They include dedicated channels, dial-up facilities in all locations and higher speeds. Although the present tariffs do not encourage a higher character transfer rate, the equipment installed can easily accommodate 1,200 char./sec asynchronous and 200-4,800 bit/sec synchronous terminals.

Robert B. Field is vice-president for product marketing at Tymnet, Inc., 10261 Bubb Road, Cupertino, Calif. 95014.

System Lowers Insurance Costs

(Continued from Page S/10)

claims information on a specific policy can be called up and displayed on a screen for inspection within a few seconds' time, Riggs said.

Another advantage of the dispersed processing network for the client is the compression in time between the entry of data to the network and the generation of finished reports.

"Previously, the postal service handled most transfers of data," Riggs said. "This often resulted in a long delay, sometimes weeks, before reports could be prepared and delivered to the client. With our dispersed processing network, data is delivered to Amarillo on an on-line basis, thus providing for a much faster production of complete reports. We can now work a very tight schedule; if necessary, reports can be produced for clients on an overnight basis."

Full-Time Circuit

Communications between the client office and the computer center in Amarillo is typically achieved over leased telephone lines. "The volume of raw data handled by many of our clients is enough to require the use of a telephone circuit full time," Riggs reported. For users with a lesser volume of traffic, Wats service or even standard direct dial service may suffice.

When data has been competely processed, reports are generated and transmitted back to client offices over the same telephone facilities. Special printer units associated with the workstations are then used to convert the processed data into hard-copy management reports that can be used by financial executives representing client companies.

Currently, about 30% of the total volume of data transmitted to Corporate Systems is accomplished with the aid of the Datashare systems. The company receives most of its other data through the mails or a teletypewriter service.

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Union Carbide Net Serves Firm Worldwide

Special to CW

Union Carbide Corp. has achieved operating benefits, thanks to a companywide data communications network.

Since first installing remote batch systems in 1970, Union Carbide has added to its network. Today there are over 100 Data 100 systems located in its sales offices, warehouses and manufacturing plants around the U.S., Canada and Puerto Rico, with new overseas installations now on-line.

Systems run the gamut from remote-batch terminals to card and tape-oriented systems, to key-to-disk data entry systems. This network feeds two large computer centers where administrative, financial, order entry and scientific data is processed: one in Tarrytown, N.Y., containing two IBM 370/168s; the other in South Charleston, W. Va., containing two 168s and a 370/165.

The impetus that led Union Carbide to first consider Data 100 equipment over seven years ago came from a need for more effective and economical remote-batch processing. "Union Carbide is a very cost-conscious company," Ed Bird, manager of data and support services, said. "Price/performance is the name of the game."

The company decided upon Data 100 after measuring its remote batch terminals against IBM 360/20 computers and various IBM batch systems, the Univac 1004, and other vendors' equipment. "Data 100 gave good service, the quality of its printing was better than that of the other vendors and equipment reliability was generally higher," Bird said.

The price/performance criterion has applied ever since as more sophisticated systems have been added, providing concurrent data entry and batch transmission. Today the remote sites using key-to-disk systems possess virtually all the data entry and editing capability that would be available in a large data center mainframe.

Improved Throughput

"Taking the systems as a whole," Bird continued, "we're averaging about 20% improvement in data entry throughput compared with the old card equipment. Our remote locations today submit a total of about 86,000 batches per month to the two data centers and print about 300 million lines per month."

One of the most advanced systems in the Union Carbide network is located at the Films Packaging Division in Chicago. This plant, which manufactures casings for a number of food products such as sausages, turkeys and hot dogs, has been an industry leader in the application of key-to-disk systems to business problems.

The first systems were installed in 1974, replacing IBM 129 card equipment for production jobs such as inventory, payroll and accounting.

According to Dick Pearson, systems analyst, "With the 129s, we were having difficulty getting clean source data from the user departments. With the Keybatch units, we were able to put in a large number of edits based on knowing exactly what should be on each individual source document. The user departments now know exactly what is required of them, and the system edits out any mistakes before the batch goes to the host computer. We've cut down our reruns tremendously."

Keybatch Software

Under Keybatch software, data entry operations proceed under control of an input format which defines data validation checks, field editing and arithmetic/logical operations. The operator has a number of modes available to check the accuracy of data during and after the entry operation, perform an audit of records in the system and automatically update a batch after records have been changed, added, or deleted.

After the systems had proved themselves in the production environment, the division began looking into other possible applications — specifically, order billing and order writing, two of the most vital operations in the company.

The division had been using Friden Flexowriters and Burroughs Corp. billing machines for order writing and billing. "We were getting a 40% to 45% error rate because the system was so highly manual, Pearson said. "Consequently, we were working overtime two or three nights a week."

Working with Data 100 personnel, the division developed a billing system that took advantage of the Keybatch system's editing capabilities and disk storage. Especially vital to the application was the Index Sequential Table Retrieval (ISTRA) software, which enables a number of items to be stored and retrieved without operator intervention when batch data records are being created.

Aesop Implemented

This was followed by implementation of Aesop — Automated Entry System Order Processing. Orders come into Chicago from sales offices and warehouses around the country and abroad, detailing the products that

(Continued on Page S/36)

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TNS Aimed at Users With Short Inquiry Needs

(Continued from Page S/13)

or DDS interface unit.

Terminals enter messages to TNS via the polled or dial-up interfaces. Messages received by the network are checked for transmission and format errors, speed-converted and switched to the addressed customer. In addition, the network will determine if access to an addressed host is restricted and, if so, will block the message accordingly.

The network inspects incoming messages for correct format and excessive length (over 128 customer text characters) and performs a Longitudinal Redundancy Check (LRC). Character parity is checked in the polled terminal and host computer lines in addition to character count for the dial-up terminals using the Touch-Tone character set.

If Bell dial-up terminals (or comparable non-Bell terminals) are being used, a four-bit parity check is also made.

Error recovery is accomplished through retransmission. Diagnostic routines are initiated if retransmission is unable to bring about recovery, although the quantity of retransmissions necessary to trigger the diagnostic routines has not been specified.

If Bell terminals are being used, the dial-up Transaction I will not retransmit at all, while the dial-up Transaction II and the polled Transaction III will send three transmissions and then advise the operator of the need for manual intervention.

Bell's design goal is one undetected error for every 10 million messages (or more). This criterion applies to the polled network with any terminal and to the dial-up network with Bell terminals or non-Bell terminals employing similar protocol. In the case of the dial-up network being accessed with a standard Touch-Tone telephone, the goal is one undetected character error for every 10,000 characters (or more).

No message is assumed to be delivered until the protocol of each element in the system is satisfied. Any message accepted by the network that cannot be delivered will be returned to the originator with an indication of the reason. Terminals utilizing voice response will receive a spoken explanation.

Two dial-up terminals are available from Bell at the customer's option: Transaction I and Transaction II. Differing only in feaures, their basic operation is similar.

They both include a built-in Trim-Line telephone as well as slots for insertion of a dialing card and a customer card. The slot for the customer card is designed to enable the Transaction telephone to accept input data from a card containing a magnetic stripe formatted according to the American Banking Asocition's track-two standard.

In addition to the features just described, the Transaction II telephone also includes an eight-character visual display. The "Erase" button is used in a step-by-step call-up of groups of characters from the buffer. The buffer size is 63 characters on the earlier version and 128 characters on the Transaction IIA.

Polled Option

Bell will provide, at the customer's option, a polled terminal called Transaction III. From the operator's viewpoint, the Transaction III is identical to the basic Transaction Telephone except that a telephone handset is not included and therefore, tone and voice answer-back are not possible.

There is also a difference in response time: with a polled terminal such as Transaction III, an operator can reasonably expect a response within 5 to 7 seconds of the inquiry, while with dial-up terminals the response would be significantly slower and less predictable.

From a system designer's viewpoint, the Transaction II should be considered from volume and/or security aspects. (A host computer can prevent "foreign" polled terminals from access, but if it authorizes access by one dial-up terminal, it must authorize access by all dial-up terminals.) The Transaction III operates, of course, at 1,200 bit/sec (half-duplex).

Pricing Structure

The Transaction I telephone rents for $22/mo to $24/mo, the Transaction II for $32- to $36/mo and the Transaction III for $35- to $37/mo. Installation charges are extra. Dial-up access to TNS is charged according to existing tariffed telephone charges.

Other charges vary depending on area, but the Minneapolis, Minn., metropoitan area can be considered typical: Polled access to the network costs a flat $14/mo. The host computer connection to the network costs a flat $650-, $700- or $850/mo for speeds of 2,400-, 4,800- or 9,600 bit/sec. The cost of a modem or DDS interface unit as the host computer site is not included.

There are also usage charges: A base price of $11/mo includs 200 "Transmission Message Units" (TMUs), where a TMU is based on a combination of transactions and characters per transaction. Additional TMUs cost 2 cents each. Based on typical applications (500 to 1,000 transactions per month), additional TMUs would constitute one-third to one-half of the costs of the TNS (which, again, does *not* include terminals or host site modems or DDS interface units).

Dick is communications project editor at Auerbach Publishers Inc. and this article is taken from Auerbach Data Communications Reports.

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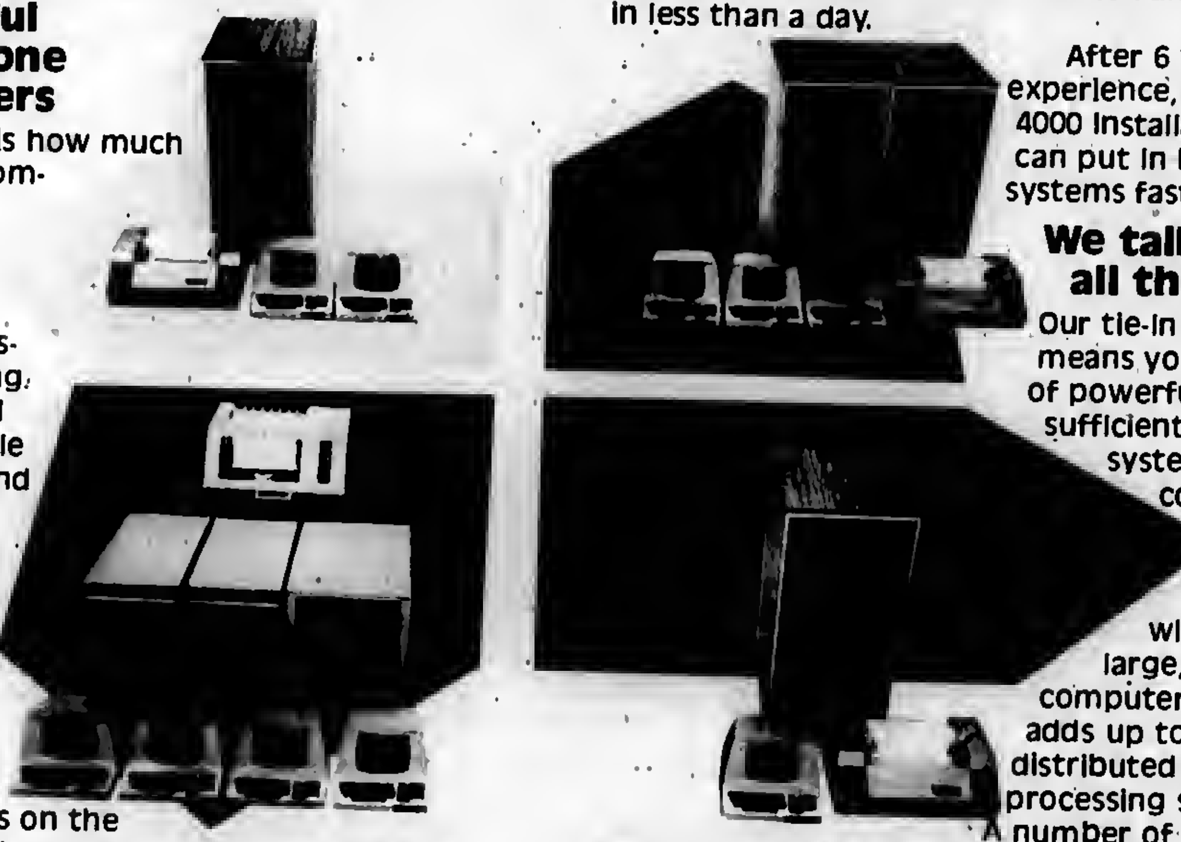

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Reliability Vastly Increased

Modern Nets Save More Than Time, Money

Special to CW

Few technologies in recent years have grown as rapidly in reliability and cost-effectiveness as have communications networks — especially in the realm of remote computing services.

While advances in high-speed, digital data transmission, monitoring techniques and systems configuration have required more sophisticated equipment, users have seen marked increases in network reliability, error detection and capacities for handling large volumes of data.

Just 10 years ago, remote computing companies were used only for applications that required small amounts of input and output. Today, some of the largest DP users have become aware of the economy and capabilities of remote batch and time-sharing computer services. The large-capacity communications network has been recognized as the only way to effectively and efficiently distribute state-of-the-art computing power to the largest number of users over diverse geographic areas.

The network concept is a cost-effective one. By "sharing" a single data center, or a complex of data centers, both operational costs and, subsequently, billings to the user may be held at a minimum.

Utilizing more than 1,250 local dial-up ports, United Computing Systems, Inc.'s communications network, Uninet, for example, currently serves customers in more than 140 cities across the U.S. and Canada, with European access effected through the Tymnet network.

By January 1978, however, Uninet will itself extend to Europe, allowing both remote batch and time-sharing users to communicate directly with data centers in the U.S., without the need for auxiliary, interactive networks.

Customer Concerns

Hardware is still the core of the computer services business, but spirited industry competition for a larger share of a growing market has placed increased emphasis on dependability and customer service. Technogical innovations have contributed to this trend.

Some companies have invested substantial staff hours and capital in the development of more efficient methods for large-scale data transmission and systems configuration. The resultant benefits have been passed on to the user in the form of increased computing capabilities at reduced costs.

Data transmission techniques have become highly sophisticated over the last several years. As recently as 1972, a line speed of 4,800 bit/sec was standard throughout the industry. Today, 9,600 bit/sec is the most common speed for analog service. In the early 1970s, a terminal capable of transmitting 30 char./sec was considered high-speed. Today, the 30 char./sec terminal is in major use and 120 char./sec is rapidly evolving as a standard.

Computer utilities are becoming better equipped to transmit large amounts of data. AT&T's Digital Data Service (DDS), already available in some locations, permits a line of speed of 56 kbit/sec and eliminates the need for converting digital information to an analog format for transmission over telephone lines.

Because DDS is expressly designed and equipped for passing digital signals, interface with the telephone network is simplified and reliability is enhanced, while the likelihood for error is greatly reduced. This, in addition to the increased capacity for handling larger jobs more quickly, will further strengthen the remote batch segment of the computer services industry in coming years.

Combined with large-capacity Modcomp II data concentrators, this DDS offering has enabled United Computing to begin integration of both timesharing and remote batch networks into a single operational system. A common front-end system, with the same operating software, will evenly distribute the entire transmission load. This will result not only in reduced communications costs, but in improved service reliability as well.

As more DDS installations become operational, more users may be supplied with higher quality remote computing capabilities at moderate rates.

These and other technical innovations are contributing to the ever increasing status of network communications.

AGILE IS HERE

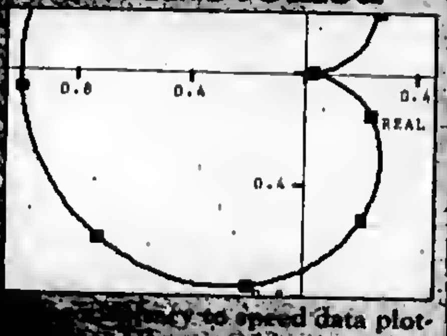
[illegible] Agile A1 Sighting Reported
[illegible] throngs fill streets

Excitement swept the populace recently as word of the first sighting of the Agile A1 daisy-wheel terminal was flashed throughout the metropolis. The A1, reported to be the first in a long line of microprocessor-based terminals to be offered by Agile, arrived from the firm's large new manufacturing facilities in Sunnyvale, California. A large production run for inventory was said to account for the immediate delivery of the terminal.

Early dispatches reported that every A1 terminal undergoes long burn-in at high temperature to assure purchasers of reliability. Inspection of the unit by your trustworthy reporter (which was hampered by the capering multitudes) disclosed that the A1 features a Selectric-style keyboard with illuminated function lights.

Rumors that the huzzahs of the citizenry caused a horse to bolt on [illegible] Street were found not to be

Fiendishly Clever Plot Revealed



[illegible] to speed data plot- [illegible] and business has [illegible] to light with the un- [illegible] Agile Plot Support [illegible]

Correspondent reports
26 Agile Service Centers Announced

A network of 26 service centers has been established throughout the Nation to provide care for Agile and GenCom terminals, according to late reports. All centers stock parts for both kinds of terminals, including the GenCom 300A, 300D, and 300Q machines. Centers in the major metropolises are staffed by Agile personnel, while the outlying Territories are served by carefully selected independent companies that are experienced in dealing with the Natives.

In an interview with Mr. R. Bullene, who identified himself as Agile's national service director, your correspondent elicited the following: "It's one thing to have an agreement for national service. It's quite another to have the necessary support in place. We're ready to provide service almost anywhere in the country."

Mr. Bullene solicited direct inquiries via the new electric telephone system at (408) 735-9904.

Variety of lease plans available for Agile A1

Attractive one-year operating leases

Longer-term, high equity plans also offered

(Story on page 6, col. 3)

Exclusive!
Agile Optional Features Revealed

This chronicle has obtained a compendium of the optional features available with the Agile A1 terminal:

◇ Justification mode, which allows the terminal to produce perfectly justified text. Variations in the 1/120-inch inter-word and inter-character spacing result in output of nearly photo-composition quality.
◇ A transparency feature allows the printing of all 128 ASCII characters to make debugging and error locating easy.
◇ Data compression allows the user to drive a 55-cps mechanism with a 300-baud line.
◇ The print enhancement option features automatic overstrike and underscore to produce bold, enhanced printing at high speeds.
◇ Hardware options include special keyboard configurations, 45- and 55-cps mechanisms, and custom microcode features.

Details of Agile's options are too voluminous for this brief treatise, but may be had through contact with the manufacturer.

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Agile promises shipment on receipt of order.
(Story on page 2, col. 4)

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Agile A1 will appear at the Mini/Micro Show December 6, 7 and 8

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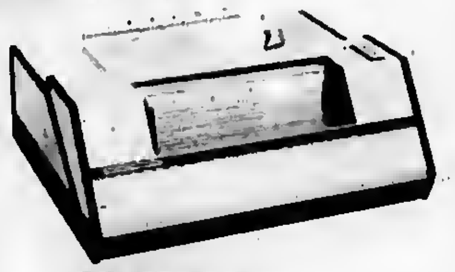

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Union Carbide Net Links Offices Worldwide

(Continued from Page S/33)

must be manufactured to customer specifications.

"By using the edit, we're able to produce a production 'set' that fits customer requirements and our own ability to make the product," Pearson said.

"Once we output the production set it goes down to our production or finishing departments, and there's no turning back. If we make a mistake — say a typographical error that results in a casing 22 inches long instead of 28 inches — the division loses money. With Aesop, we've cut dollar losses significantly because the orders won't be produced unless they conform to specifications," he added.

Once the two systems were up and running, the error rate dropped to 5%. "Our throughput at the data center has increased by 35%," Pearson said, "but the most important thing is that the data is clean when it arrives at the host computer, saving a lot of reruns and computer expense. And we manage it with keypunch-trained operators. Another good feature of Keybatch in a 'sweat shop' environment like ours is that the user is not limited to the number of different programs that can run. We run between 350 and 400 programs here."

Hardware Setup

Current hardware at the Films Packaging Division consists of two Keybatch data entry terminal processors, each with 10M bytes of disk storage, four local and four remote CRT keystations.

The systems share a 300 line/min printer and a 9-rack tape. Remote job entry to the host computer in Tarrytown is handled by a Data 100 Model 78 system, with card reader, 400 line/min printer and two magnetic tapes. Each Keybatch system backs up the other so that data entry jobs can be switched in the event of hardware or software problems or changes.

A satellite plant in Ottawa, Ill., communicates directly with the Chicago system through remote CRTs, entering its own orders and doing its own billing. Pearson said the division is considering installing similar low-cost data entry stations in all outlying warehouses, giving the remote locations all the editing power now available at Chicago.

Late in 1977, the division will take delivery of 20M-byte disk units to meet the need for increased data storage. "We maintain over 6,000 batches of data on our Aesop system disk," he said. "On our invoices we have to print each customer sausage casing recipe. We're trying to keep 15,000 individual recipes on disk for instant recall, so we need plenty of storage."

Companywide Expansion

Union Carbide is proceeding toward a worldwide data communications network. A large Keybatch system was recently installed in Geneva, Switzerland, to support administrative and scientific processing through both the Tarrytown and South Charleston data centers. Soon to be in operation is a system in Hong Kong, with additional sites planned for Europe and Asia.

Continuing system development activity will see companywide standardization of certain applications such as payroll and personnel accounting.

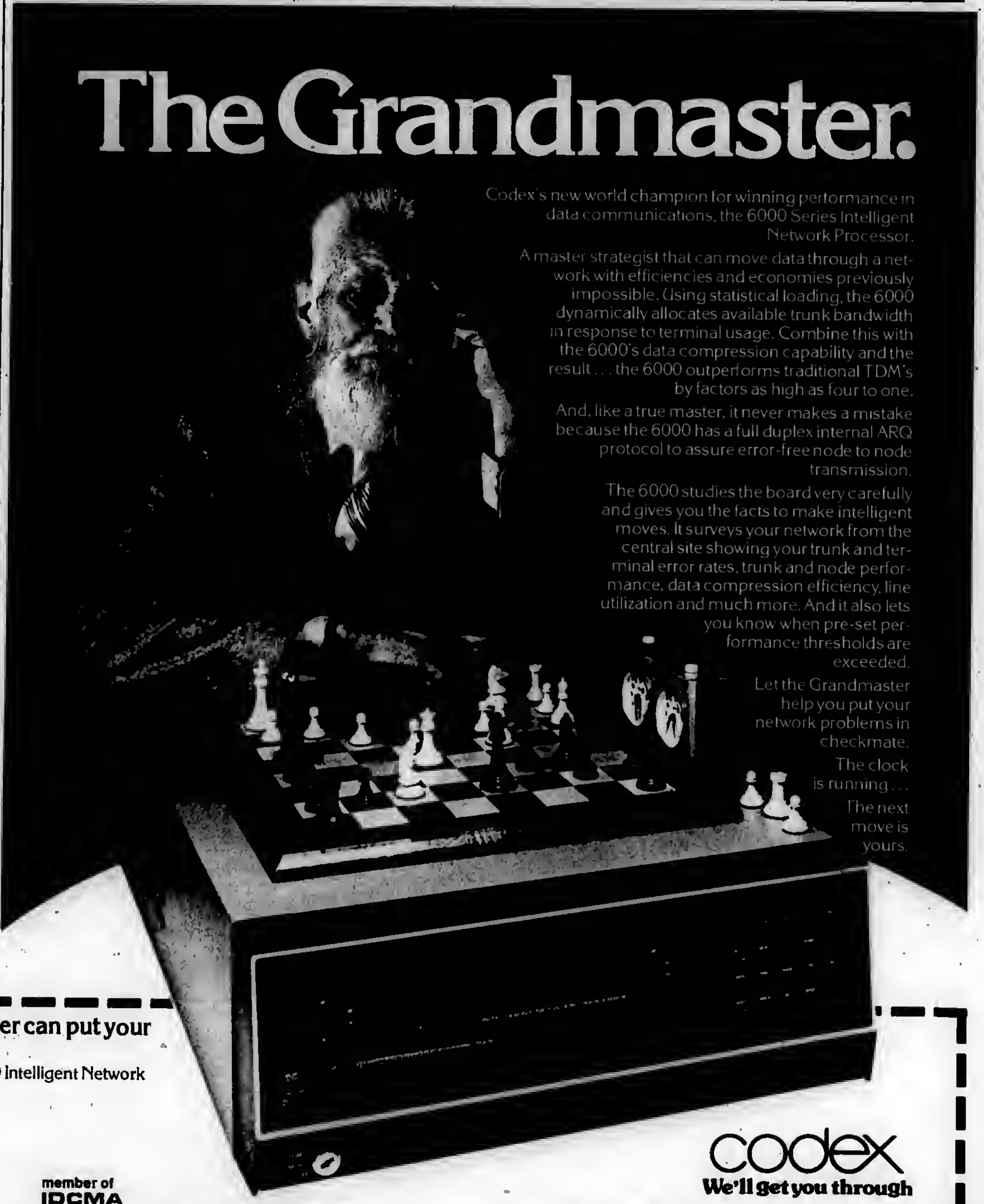
A significant enhancement to the company's printing capacity is planned for the new computer center being erected in South Charleston. Two Model 78 remote processing systems will each support two IBM 3211 printers, operating at 2,000 line/min over 50K bit/sec lines.

Printing capability of this magnitude has rarely been attempted anywhere in a remote system. "Practically all the printing will be done at the user's site instead of at the data centers," Bird said.

Service is important to Union Carbide because of its far-flung network, which places systems not only in large population centers like Chicago, New York and Houston, but in such locations as Centerville, Iowa; Cartersville, Ga.; Theodore, Ala; and Freehold, N.J. Data 100's field service organization will use an automated maintenance system that provides a near "real-time" method of responding to problems and reporting maintenance activity.

A user in any location now calls one central number when service is required. Maintenance personnel are immediately dispatched from the nearest Data 100 office, perform the maintenance, and file a complete call report, which then is processed by computer.

Every month, Data 100 provides Union Carbide management with a "report card," listing every machine in the network, how many calls are made to it, how long it took service personnel to respond, maintenance time and total downtime.



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*Patent Pending

Three Nets In Buffalo

Point-of-Sale EFT System Attracts Depositors

(Continued from Page S/31)

institutions at the end of the first three months.

The reason for the high number of retail cards is that Tops, which had in-store check approval files, now requires that anyone cashing a check in its stores present an Instacard for identification. The card provides positive identification through the use of the personal identification number (PIN). Since the system was installed, the cards have been used for over 332,000 check-cashing transactions involving $33 million. Store managers report a notable decrease in the number of returned checks.

The institutions only issued Instacards to customers requesting them at the beginning of the program. They have, however, begun a campaign of issuing the cards to all statement account holders and will begin marketing their services to all holders of the Tops cards to try to convert them to institution accounts.

Datek, Inc., the data processing subsidiary of the two institutions, designed the system and created Instacard. Formed in 1973, Datek also serves a number of other organizations with data processing.

In the point-of-sale network, Datek is the processing arm, using its twin NCR Century 251 systems for day-end processing of the Instacard data. Two smaller Varian V-76 computers are on-line to the stores to record transactions and perform the check identification functions transmitted to them from NCR 279 financial terminals in the stores.

The entire system was designed and installed in less than a year, with programming and equipment configuration provided by Pan American Systems, a Florida-based software house. The interface between the smaller computers and the Century data processing system was written by Datek systems analysts.

Reason for Dual System

The reason for two systems — one on-line to the in-store terminals and the other for processing the data — is economy, according to John S. Kuczwanski, president of Datek. "The Century computers are on-line to the branches of both institutions," Kuczwanski said, "taking their transactions. We also use them to process the data for all our customers. By installing the smaller computers, we free up the Century system to do the job it does best — big, high-volume processing."

The two computer systems do interface, though. A primary ledger of the Instacard accounts is maintained in the smaller system. All of the in-store transactions are posted in the secondary ledger, with each account having a daily withdrawal limit. To prevent a cardholder from withdrawing the limit from a store, then going to a branch to overdraw the account, the Century computer is programmed to check the secondary ledger before it allows withdrawals from the branches and to update the secondary ledger when branch transactions occur. Thus, it is virtually impossible to cheat either system.

At stated times during the day, the secondary ledger is read to the Century CPU's file and processed.

An important point discussed in the planning of the network was the type of card to be used. "It's difficult enough to ask people to carry another card so they can access our system," according to Chase. "Some systems have separate cards and PIN numbers for each type of account, but we wanted to put the account identification for both checking and savings accounts on one card for customer convenience."

The NCR 279 terminals made this possible by their ability to read the full 40 characters on the American Bankers Association track 2. Up to 40 characters of information can be encoded on the card's magnetic stripe and read to the computer when the card is passed through the card reader.

Branch Loads Reduced

Kuczwanski feels the point-of-sale network is also meeting the second objective set for it. "After only six months of full operation, we are alredy identifying reductions in branch loads," he said. "One branch of Western New York Savings is open Friday evenings, normally with five tellers on duty. The branch manager now feels he can reduce this to four tellers, yet the activity level on his accounts remains high. That's significant in this short period of time, and it proves we are taking customers out of the branches and into the stores."

With the start-up experience behind them, the people at Datek and Instacard are working to expand the network as rapidly as possible. New stores are being added at the rate of one every two weeks until 32 Tops locations will be on-line. Instacard is also talking with other thrift institutions in the area, offering them the opportunity to join the network.

Plans are being made to expand services to cardholders. In addition to the deposit, withdrawal and check-cashing functions, the system will eventually support loan payments.

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Multiplexers Improve Credit Data Transmission

(Continued from Page S/27)

However, most credit networks — TU, for example — don't necessarily recommend these bureaus use devices other than Bell System modems. One sane and cost-effective tactic the end user can implement is to simply replace the Bell devices.

The Merchants bureau of Bakersfield, Calif. slashed its current phone bill by 35% and at the same time, increased transmission capacity by 260%. The bureau, which is now part of TU's Chicago-to-Visalia hookup, installed Prentice Corp. Series-M FDMs, thereby reducing costs by multiplexing several terminals over the same voice-grade line.

The Bakersfield bureau was too small to have a node located at its premises but was large enough to require instantaneous data. So, initially, it called directly into the Visalia node by using what is called Foreign Exchange Service (FEX). FEX, provided by Bell for about $6 a mile, extends the dial tone from a distant point to where the user is located so that instead of making many long-distance calls, he can make unlimited local calls through the FEX line.

Expansion Problems

The FEX approach was fairly cost-effective where there was only one terminal located in Bakersfield, accessing Visalia's data base intermittently throughout the day. However, as soon as the Merchants bureau began to grow and obtain customers of its own, seeking access to the network, it found it had to add two more lines. The three lines combined were very expensive.

It is in a case like this where FDMs really shine. Prentice removed the three FEX lines and instead installed a single leased line between Visalia and Bakersfield. Then it installed Prentice M-Series FDMs on that line, interfaced to dial-up modems. This equipment offered basically the same type of service as FEX but on a larger scale.

For example, the Visalia site was given the capability to have 300 bit/sec terminals dialing in so they could contend for these three lines. Since it had three lines and three terminals, there actually was no contention.

The Merchants bureau could then go out and sell some local users — very active users — on a direct access basis. It actually installed some terminals in user premises, allowing them to call in to the same three lines and obtain credit reports instantaneously rather than waiting or calling them in for next-day delivery.

Beauty of Situation

The beauty of it was that once it added terminals out there, it was able to extend further, by selling teletypewriter — low-speed terminals — to other small users in the area that were using some other service then, perhaps having to call as far as the TRW credit system in the Los Angeles area.

But now the users had the alternative of calling directly into Bakersfield. Prentice did, in fact, install five 110 bit/sec lines, using this same single leased phone line. The cost was about one-third of the FEX they had before installation of he Prentice FDMs.

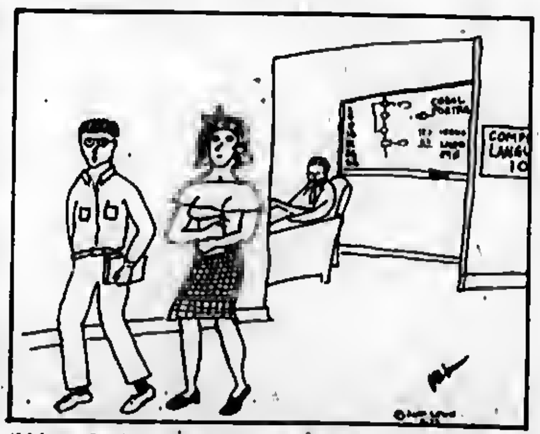
Before the Bakersfield bureau switched to FDMs, it could have functioned adequately. But merchants in its service area wanted faster resonse, and if they couldn't get it thorugh Bakersfield, they were willing to call as far south as Anaheim to link with the TRW System. And because the TRW route meant lost revenue to the Bakersfield bureau, it decided it would not tolerate that loss.

Prior to the Merchants bureau automating, it made out manual reports, called the Visalia node — or some other bureau — to get manual information. Obviously, that isn't cost-effective. But when it automated, it kept its same basic personnel, cut down response time dramatically, and processed many more reports. All this made the bureau much more profitable.

The Bakersfield installation underscores another benefit of FDMs: When a bureau grows to where a node becomes cost-effective, it can then service those outlying customers, primarily retailers. When these merchants grow to where they are linked to the computer almost full time, they can then pick up an FDM link.

In addition, by using FDMs, bureaus can tie in many different users in their area with multipoint lines so that a widely dispersed user community is accessed cost-effectively. And because they will no longer require dial-ups, they can protect themselves from future increases in dial-up rates, which in the case of Bakersfield, won't be impacted for some time.

I think the question of when a local credit bureau is ready to switch over to FDMs is tough to answer because of all the variables. But in some cases the right amount of user pressure determines the crossover point.



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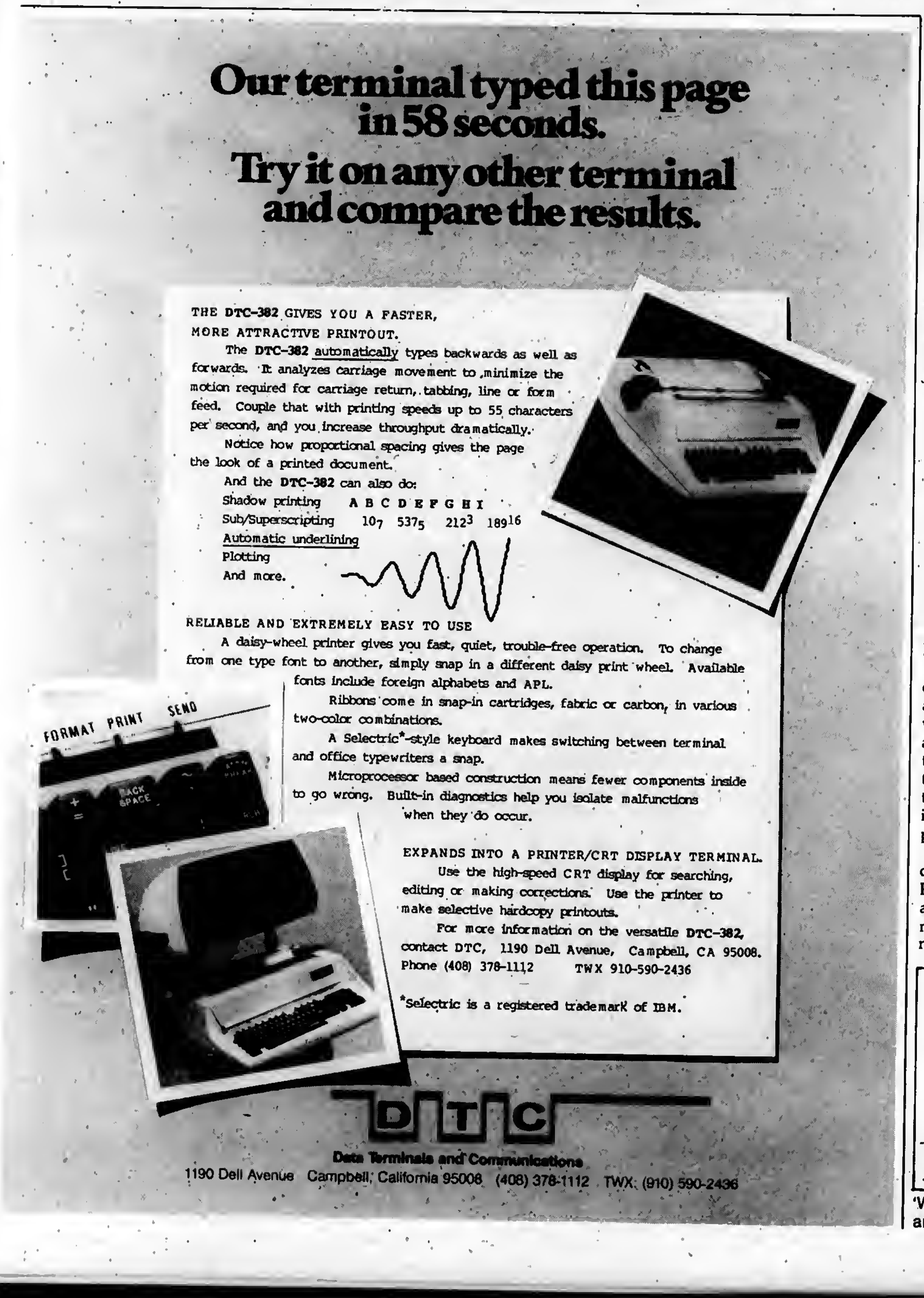

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In California, Georgia

'Pacuit' Switching Systems Operate Two Nets

EL SEGUNDO, Calif. – A proprietary technique for combining both packet and circuit switching in a single package is proving to be a major factor in the operation of two data distribution networks recently implemented in the U.S.

In both cases, the heart of the network operation is the M3200 Pacuit network switching and management system, an automated digital traffic manager produced by Computer Transmission Corp. here for both common carrier and private data nets.

Called "pacuit" because it simultaneously packetizes data and directs the packets to a preselected computer resource via the most expedient route, the M3200 also functions as a network manager, removing this function from the mainframe and enabling incompatible terminals and computer ports to communicate with each other through the incorporation of mini- and microcomputer components.

The M3200 was first utilized by Pacific Telephone and Telegraph in a statewide digital data network which currently serves the 19 campuses of the California State Universities and Colleges, the California Department of Transportation and other state agencies. More than 200 remote I/O stations are operating on-line with the mainframe computer at the network control center in Sacramento.

Another M3200 network is located at the University of Georgia. There are 10 campuses in the network at the University of Georgia system, including nine state and independent colleges and the Georgia Institute of Technology. The network has more than 100 terminal stations.

The Georgia network executes such applications as student registration, computer aided instruction, scientific calculations, accounts payable and receivable, budget forecasts and payroll. The central computer serving the network is a remote job entry and time-sharing system centered at the university's main campus in Athens, working the mainframe computers located at four other sites.

Migrants' Records Tracked

LITTLE ROCK, Ark. – Children of migrant workers used to leave school by the sixth grade. Now, thousands of them finish high school and some even attend college.

The Arkansas Department of Education plays a major role in keeping these children in class by operating the National Migrant Student Record Transfer System. This is a nationwide computer-based network dedicated to improving the education and health care of migrant children.

Powered by an IBM system, the program helps make sure a student's educational and medical records arrive at a school soon after he does. More than 15,000 school districts in 46 states and Puerto Rico where migrant labor is used can obtain current scholastic and medical histories of more than 500,000 children. The schools use 152 communications terminals across the nation to get needed information in hours from the computer.

The success of the Migrant Student Record Transfer System has prompted officials to add programs for children of migrant fishermen and children living in U.S. possessions such as the Virgin Islands and Pacific Islands.

Teachers know immediately which schools a student has attended and which subjects he has studied. The system also includes grades and aptitutde and achievement scores.

Keeping Up

"Educating these children is difficult because they may change schools up to five times in a single year," Winford Miller, the system's administrator, said. "By the time a school learns a student's background and develops a plan to help him, he may be gone to another state.

"The system helps these children develop a positive attitude toward education because their new teachers can pick up where the old one left off. All the infomation arrives soon after the child does. The child couldn't possibly tell school officials all they need to know, and since 40% of the children come from Spanish-speaking families, the problem was severe," he said.

The Migrant Student Record Transfer System, a federal project, started in 1970 to deliver academic and health services. The system keeps track of how long students attended individual schools, whether it be weeks or months, and helps students receive the vital credits they need.

The system is constantly updated to serve the swelling demand from local school districts. The Department of Education mails out about 8,000 record forms daily. Student records now are stored in a newly installed IBM 370/158 and updated regularly. System administrators try to answer school requests via the communications network the same day they are received. Records are mailed the day after receiving requests.

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The 400 has everything the 200 has...and more. Built around the Z-80 microprocessor, it allows software designers to expand programs as needed without additional hardware. Capabilities include complete formating and editing with block mode transmission. Also character mode for normal log-in procedures or straight character operation.

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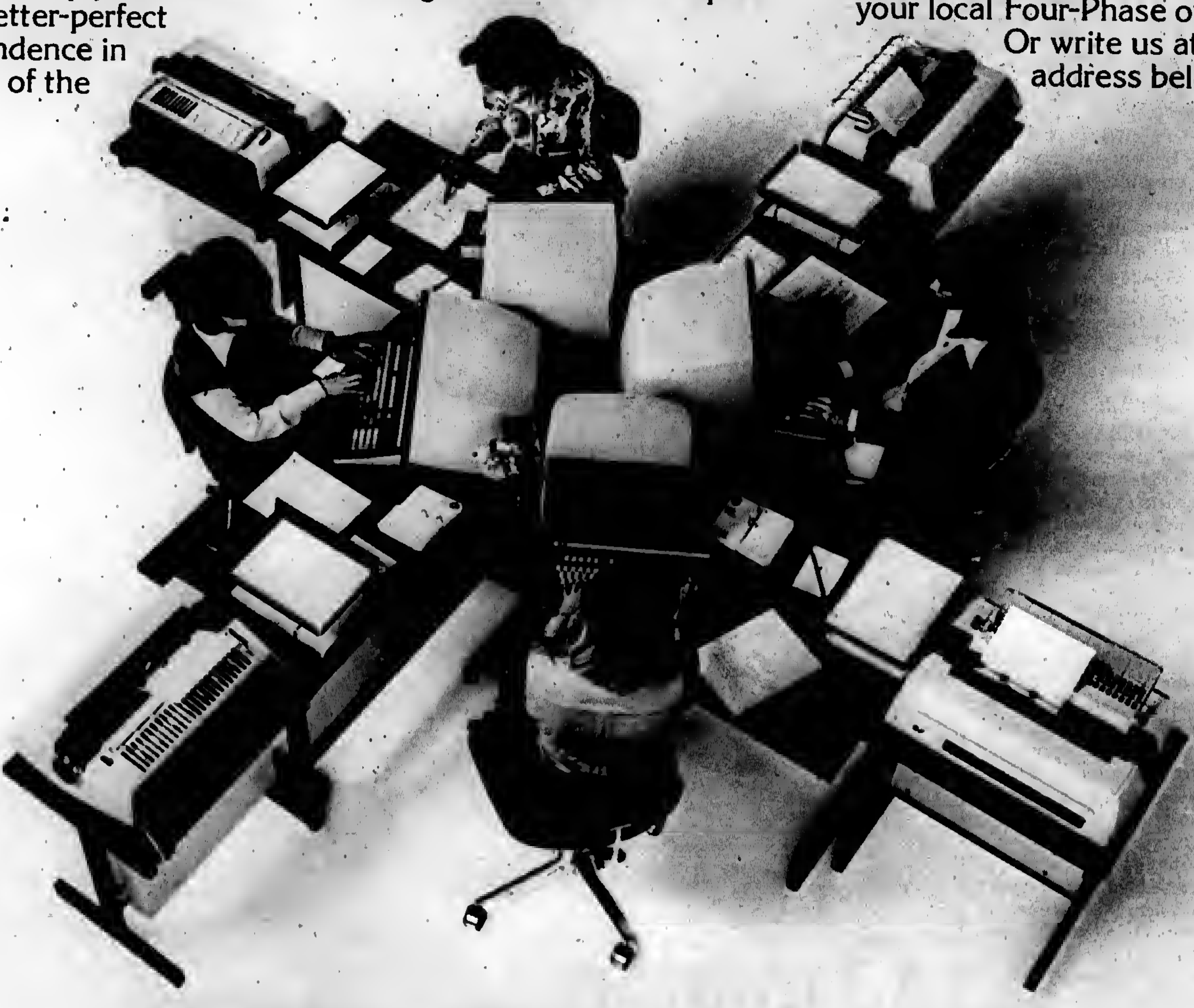

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Mini Bits

Mini/Micro Show Set Next Month

ANAHEIM, Calif. — The second annual Mini/Micro Computer Conference will be held Dec. 6-8 at the Anaheim Convention Center here.

Attendees can visit 142 exhibit booths and attend sessions on various aspects of minicomputers — selecting and evaluating a minicomputer, trends in mini/micro software, how to keep an on-line system from crashing, the use of OEM peripherals in end-user systems and computer law.

Attendance at the exhibits costs $5; show and program registration costs $15 for one day and $40 for all three days.

Additional information is available from Mini/Micro Conference, Suite 1, 5528 E. La Palma Ave., Anaheim, Calif. 92807.

Ohio Scientific Adds Drive

HIRAM, Ohio — A 74M-byte hard disk drive for small systems is available from Ohio Scientific.

The C-D74 provides a 35 msec average access time and a data transfer rate of 7.3M bit/sec. The unit uses Winchester technology, the firm said.

The Ohio Scientific drive costs $6,000 from the firm in Hiram, Ohio 44234.

Unit Stores Cassettes

COMMACK, N.Y. — The Data Products Division of Robins Industries Corp has introduced a cassette storage center.

The Robins Storage Center is made of high impact-resistant plastic and holds 72 cassettes with boxes or 36 cassettes in containers, Robins said.

The unit can be wall-mounted or used freestanding. It was designed for computer rooms, DP centers and word processing installations.

The cassette storage center, designated No. 78-023, costs $16.50 from Data Products Division, 75 Austin Blvd., Commack, N.Y. 11725.

Mixed-Vendor System

Hospital Picks Custom Mini

By Esther Surden
CW Staff

HAGERSTOWN, Md. — Now that Brook Lane Psychiatric Hospital here has put its payroll, mailing list and plant ledger applications to bed, the institution is beginning to bring its outpatient, inpatient and accounts receivable operations under control.

Designed for the hospital by an independent consultant, the hospital's minicomputer-based system includes hardware from many vendors.

The heart of the system is a 16K Interdata, Inc. minicomputer; peripherals include a Lear Siegler keyboard/CRT, two Shugart floppy disk drives and a Teletype Model 40 line printer.

The consultant, Robert Mack, designed the mini's operating system himself.

The hospital decided it needed a minicomputer because, although its mechanical accounting machine could keep up with the patient billing, "we couldn't get the general management reports and reports various goverment bodies required," according to David K. Gerber, controller.

Digging up the statistical information needed took too much time with the old system.

So the hospital looked around for a system to fit its needs. First it looked at an IBM System 32 in use at another hospital, but the stock types of programs available didn't "offer us the flexibility we thought we needed," Gerber said.

The IBM system also didn't operate "nearly as quickly" as the system the institution has installed now, he said.

Mack contacted the hospital about installing a system, Gerber recalled, and the promised system seemed to be just what the doctor ordered.

These applications are presently up and running. The payroll program produces the checks for about 115 people every other week.

The mailing list application has about 1,500 names on file so the hospital can inform members of the clergy of its pastoral education program.

(Continued on Page 50)

Auerbach Reconfigures Mini Report Services

PENNSAUKEN, N.J.— Auerbach Publishers, Inc. has divided its previously offered reports on minicomputers and small business systems into two services, covering each topic individually.

The first service includes two volumes of reports designed to enable readers to evaluate business minicomputers. Reports cover the areas of small business computers, office computers and intelligent terminals.

A tutorial report on business minis explores recent trends and developments with these systems, the company said.

The second service, which also includes two volumes, provides information on general-purpose minicomputers from U.S., European and Japanese makers.

In this set of reports, users can find information on microprocessors, microcomputers and minicomputers, process control computers and minicomputer peripherals.

Detailed articles are provided on each product. These articles include a system overview, competitive analysis, configuration guide and maintenance, support and price data.

The reports are updated monthly, the company noted and late-breaking developments on the mini scene are covered in hotline reports.

The services cost $365 each and are available immediately from the firm at 6560 North Park Drive, Pennsauken, N.J. 08109.

DEC Adds LSI-11/2 Family, Runs RT-11 Software Subset

MARLBORO, Mass. — Digital Equipment Corp. has expanded its LSI-11 line with the addition of a family of microcomputers called the LSI-11/2.

The LSI-11/2 systems are said to be software-compatible with the LSI-11 and offer a price savings of up to 44% below the existing products.

A basic microprocessor unit (MPU), several microprocessor and memory configurations called the LSI-11/2 and a variety of memory modules the same half-width size as the microprocessor are available, DEC said. In addition, users can purchase matching-width card guide and backplane assembly.

The MPU, mounted on a 5- by 8.5-in. module, has been designated the KD11-HA. This unit is available without memory in quantities of 50 for applications requiring custom random-access memory (RAM) or read-only memory configurations, a spokesman noted.

The LSI-11/2 units were designed to suit applications where space or cost is critical, the spokesman said. Hardware options include a serial line interface card with four RS-422/423 independently programmable channels and a kit for interfacing and control applications.

Under a subset of the RT-11 operating system, the systems can execute programs developed on a full RT-11 system. Called Runtime RT-11, the software permits programs developed in Macro-11, Fortran, Basic-11, APL and Focal to operate on the LSI-11/2, DEC said.

The LSI-11/2 microcomputer with 16K bytes of RAM costs $851. The KD11-HA costs $459 in 50-unit quantities; in 100-unit quantities the Runtime software can be licensed for $97.

All the products will be available early next year from DEC's Components Group, One Iron Way, Marlboro, Mass. 01752.

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Riverbend Farms Growing More Than Fruit

SANGER, Calif. — Fruit isn't the only thing that's growing at Riverbend Farms, Inc. here.

The data processing operation will be expanding soon too, from an IBM System 32 to the recently announced IBM System 34, according to Perry Walker, vice-president of Rivcom Corp., Riverbend's DP subsidiary.

Riverbend Farms started out growing fruit; now it is primarily in the fruit processing business. "In 1967, we started to process fruit for some of the area farmers and shipped about 20,000 cartons. By 1974, we were shipping more than three million cartons," Larry Harris, Riverbend president, recalled.

Rapid growth prompted the move to a small business system. The company chose IBM because of service.

"The heart and soul of our business is in the machine," Walker explained, "so we needed a vendor which was able to come out and fix the system when it needed fixing.

"We are dealing with a perishable product whose price changes quickly," Harris added, so the company also needed a system that would enable it "to make quick decisions with confidence."

At first the firm used a contract programmer to develop the specialized programs for its system. Because produce "is such a volatile business" and changes needed to be made on demand, however, the firm brought the programmer in-house, Walker said.

Firm Saw Potential

After that, the company saw the potential for developing programs for the industry, so it made the DP operation a subsidiary which does Riverbend's DP and sells software to others, both in and out of the produce industry.

In late March or early April, the firm's DP operation will receive an IBM System 34. Plans are already being made for the installation of the system, Walker indicated, and an analyst from the firm will attend some training sessions in December and January on the system.

The reason for moving to the System 34 is to get more timely information, he added.

Pooled Produce

"One of the big problems in the packing business," according to Harris, "is getting enough information to growers. Part of the reason is that income from the produce is pooled.

"Since the growing season is long and complex, income from the produce must be pooled to be equitable.

"It wouldn't be fair, for example, for a grower whose crop was picked last month when prices were high to get a better price for his fruit than the grower whose crop is picked this month after prices have dropped slightly.

"We usually have an early maturity pool and a season pool, but some packers have monthly pools," Harris said.

"The growers used to say, 'We never know enough,' but now we have a meeting every Satuiday. We furnish them with a listing showing a year-to-date summary of fruit delivered, packed and sold.

"They also know who delivered it to the packing house and when. It is very important to tell the grower his value of product packed at any given time."

Another valuable report produced by the system is the juice statement. Money is distributed from the juicing operation to the proper grower depending on pounds of solids received and juice content.

This requires storing records on the system over an extended period. When juicing operations are completed, data on grower, variety and season are keyed into the system and a distribution report is produced by grower and prepares the necessary checks for payment.

"We use the system to produce an aged accounts receivable, and sales analysis reports," Harris said. "But, aside from grower accounting, I think our No. 1 need is payroll processing.

"We have as many as 400 employees working in the peak seasons. There is a great deal of turnover in the field crews. There is no withholding for field workers, but there is full withholding on workers in the packing operation.

"The System 32 was the first small system I found that seemed sophisticsted enough to do grower accounting and handle an agriculture payroll. It was small and inexpensive enough to start with, yet had plenty of growth potential.

"We started with a 40 char./sec print capability and 5 million words of on-line disk storage. We've upgraded the system several times and now have 155 line/min print capability and 13M words of on-line disk storage.

"We also use an IBM 3741 as input to the system to handle a remote packing operation."

Process Unit Micro Based

FOXBORO, Mass. — The Fox 3 from The Foxboro Co. is a microprocessor-based process control system that can be added to the company's Spec 200 electronic control systems using a data communications link.

The Fox 3 features modular software, designed to "simplify system design and operation," the firm said.

All programming activities are performed in a high-level conversational language which combines process-oriented phrases and conventional algebraic expressions, a spokesman added.

A software display package provides preformatted displays on color or monochromatic CRT screens as well as the capability to develop special user displays for unique process requirements, he said.

Other features include on-line programmability and self-diagnostic troubleshooting, Foxboro noted.

The system ranges in price from about $25,000 to $50,000, not including I/O units. The exact price depends on how it is configured to a specific user's needs. Information is available from the vendor at Department 120, Foxboro, Mass. 02035.

Hospital Opts for Custom Mini

(Continued from Page 49)

In the future, the mailing list application will be used to keep physicians and other referral sources informed of the services the hospital provides, he said.

The third application on the system is the plant ledger. This was previously performed by a service bureau and provides the institution with a listing of its assets and keeps track of the depreciation of all the items the hospital owns.

A generated report records the current value of each item and its replacement cost; that information is used for insurance purposes.

The next big step is the patient billing application, Gerber said, but "this will take us a while." The patient billing system will include inpatient and outpatient billing and accounts receivable applications.

The payroll application produces those necessary governmental reports including the firm's quarterly 941 reports and a quarterly report to unemployment. It also prepared the W2 forms at the end of the year.

A somewhat different aspect of the system is its ability to print out on each employee's paycheck the number of sick days, vacation days and holiday time not yet taken by the employee.

"We are pleased with the system's flexibility and what it has provided," Gerber said. The only drawback is that the implementation schedule has lagged beyond what "we had hoped for."

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And Cuts Material Waste

Clothing Firm's System Helps Shrink Inventory

MOUNT AIRY, N.C. — A clothing manufacturer here has achieved significant savings by reducing inventory and cutting raw material waste as a result of implementing a production planning system based on a small business system.

Spencer's, Inc. has built its system around a Univac 90/30 and two software packages — the Information Management System/90 (IMS/90) and Information Collection System/90 (ICS/90).

A vertically integrated concern performing bleaching, vat dyeing, preshrinking, cutting and knitting operations, Spencer's has been experiencing a growth rate of 15% to 20% each year.

The company employs 1,800 persons and has four plants — three in Mount Airy (two for clothing manufacture and a third for box production) and a fourth clothing manufacturing facility near Hillsville, Va.

The firm installed its first system, an IBM System 3/10, in 1971 but by 1975, according to William C. Sigmon, DP manager, "we were running out of steam.

"Our workload had increased enormously, we needed more disk storage capacity and we wanted to have a communications-oriented machine," Sigmon explained.

"After looking at the major competitors, we selected Univac and its 90/30 system. We liked the ease of facilitating communications using the IMS/90 software package and we favored the vendor's "bundled" approach. We also preferred its spooling package and the growth capabilities of the system.

The 90/30 was installed in July 1976. It has a main memory of 163,000 bytes, three Univac 8418 disk drives with a capacity of 173.7 million bytes, an integrated card reader and printer.

Two Uniscope 200 visual display terminals along with a three-station UTS 400 cluster are connected to the processor. A five-station UTS 400 is now being installed to replace the remaining keypunch units.

One-Shift Operation

"Since the 90/30 began operating, we have been able to accomplish all of our work in one nine-hour shift, five days a week with ample time available for additional applications. With the System 3, we had to run 1-1/2 shifts daily and work a half day on Saturdays, and this did not include several applications now running on the 90/30," Sigmon said.

"Another drawback with the old system was that new applications we wanted to run were backed up because of a combination of running out of time and not enough disk capacity," he continued.

"ICS/90 is the first applications software we have purchased and we feel it is well worth the price." It allows the user to change formats as needed and gives a great deal of flexibility, he claimed.

Sigmon also said he considered the Unique language used with IMS/90 extremely good and the OS/3 operating system "easy to use with good recovery procedures."

One of the key applications on the 90/30 system has been sales analysis for Spencer's own internal use and for all its customers.

"Every two weeks," Sigmon noted, "we provide our customers with a detailed history of their orders broken down by item and listing our sales to them by actual volume and dollar amounts."

"For our own sales staff, we perform a monthly sales analysis by territory, by customer and by item so we can keep abreast of the general sales picture and industry trends and find out those items that are fast movers and those that are lagging. In addition, we prepare a report on individual salesmen's performance semiannually," Sigmon said.

"Previously, we could only do a limited amount of sales analysis but now we can do it for more people in more ways, using a large detailed sales history file.

"The system has also given us the capability to do extensive production planning. This starts with our receiving a forecast in December of what the marketing department plans to sell during the year.

"This forecast information is entered into the computer, compared with historical performance and then 'smoothed' through the year, based on past achievements.

"We can then provide manufacturing with data concerning the amount and type of material it will need to knit by poundage including sizes of material and widths of cloth," Sigmon noted.

Most Spencer orders are supplied from inventory. With the computerized production planning application, Sigmon said the company has been able to reduce its average inventory from 750,000 dozen items to 550,000 dozen.

Order entry information is presently keypunched. In the near future, the firm plans to use display terminals to directly input order data into the 90/30 using the ICS/90 program. Currently, a daily average of 400 orders is entered into the system.

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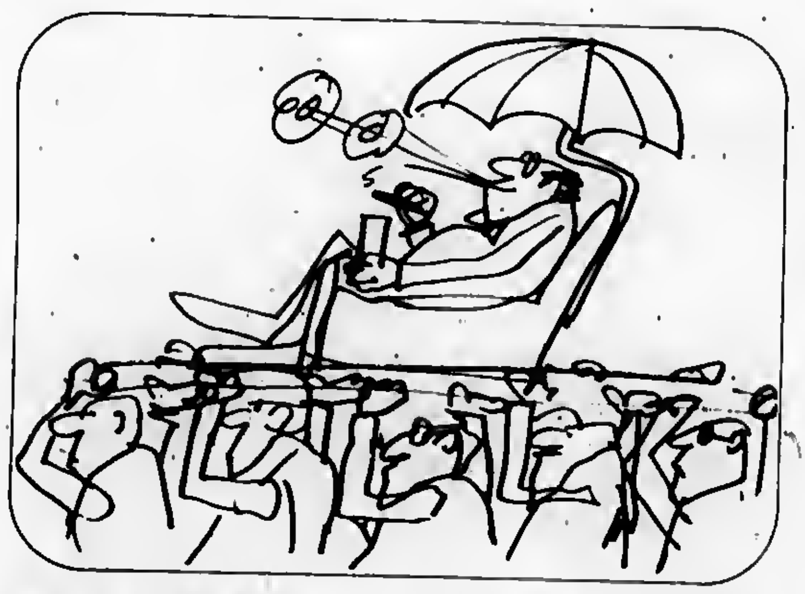

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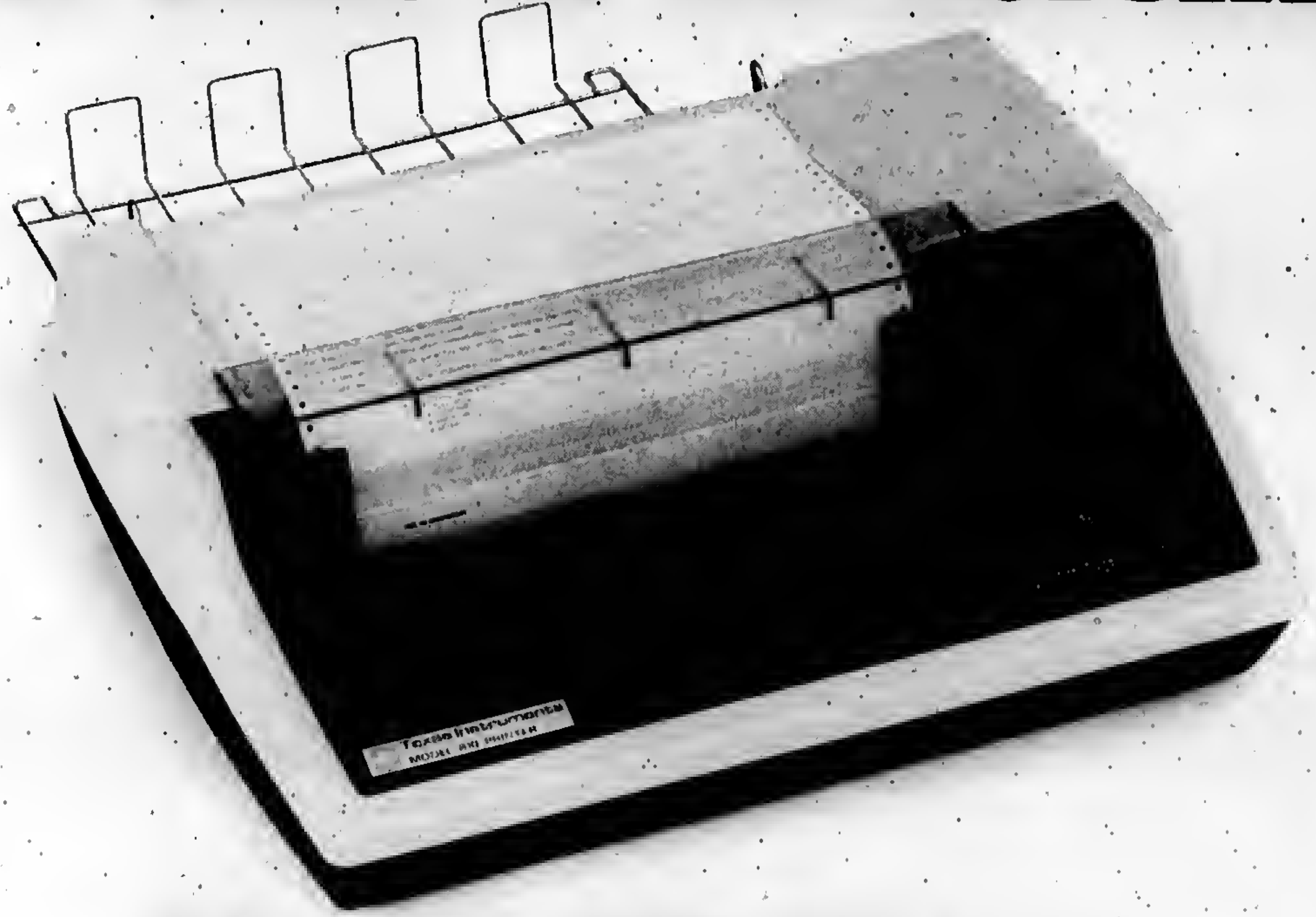

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TEXAS INSTRUMENTS.

Wholesalers Get Infomark Unit

EXTON, Pa. — Infomark, Inc. has unveiled the DMS 24, a turnkey business management system designed for order entry and inventory control applications at wholesale distributors and manufacturers.

Based on a Data General Corp. Nova 3 minicomputer, Control Data Corp.'s peripheral devices and Infomark's own operating system, the DMS 24 can support multiple interactive terminals, according to a spokesman.

Infomark DMS 24

The basic DMS 24 configuration includes the CPU, 32K bytes of memory, 10M bytes of disk, a 100 line/min printer and one CRT. It is reportedly expandable to 320M bytes of disk, 256K bytes of memory and up to 24 CRT terminals.

Printing speeds ranging from 100 char./sec to 1,100 line/-min can be handled by the system, the spokesman noted.

Operating System

The heart of the Infomark system is its operating system, according to the spokesman. Built around five interactive software modules, it was designed to provide "flexible" data preparation capabilities, on-line access to stored data, unattended batch processing of high-volume data, real-time updating and security against loss and unauthorized access to data, he said.

One module, the multiaccess editor, is the primary interface for the users of the DMS 24, the spokesman explained. It presents each user with an interactive business form selected from the applications library.

The form is used for data entry, edit or inquiry, the company said.

Data Base Control

The Data Base Control Module supervises accesses to the data base, maintains file and record structure and organizes all files on a master/-detail model with up to eight detail types handled, the spokesman reported.

A batch processing manager supplements the multiaccess editor, providing application access to the data base for high-volume processing requirements such as report generation or batch mode updates the company added.

The system is available with applications packages for general business, wholesale distributors and manufacturers and includes order entry, inventory control, accounts receivable, accounts payable, payroll, general ledger, bill of material and material requirements planning.

The basic system costs $35,000. Infomark is at 319 N. Pottstown Pike, Exton, Pa. 19341.

Radio Station Turnkey

SAN DIEGO — Automated Business Concepts is offering a radio station management system based on A.O. Smith Corp.'s Mesa Two small business system.

The turnkey system was developed to handle station sales, traffic, programming, logging, billing and music selection in addition to general accounting functions.

Designed for use by nontechnical station personnel, the basic system can process the daily activities of both AM and FM stations, according to a spokesman.

The basic system costs $56,850 for a 64K Data General Corp. Nova 3 CPU, one CRT, a 10M-byte disk drive, 100 line/min printer, all software and installation. Automated Business is located at 8828 Complex Drive, San Diego, Calif. 92123.

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The VA317S is only the beginning, Ma. Before long, all Vadic dial-up modems will have built-in DAA's. Also, Vadic has designed a complete line of stand-alone, rack mount, and card form DAA's.

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Mini, Audio System Provide Emergency Alerts

By JoAnn Roe Burkhart
Special to CW

SEATTLE — Panic and confusion — not flames — are usually the worst killers when a fire alarm goes off in a high-rise building. When the Seattle Federal Office Building was being designed, engineers therefore included a minicomputer-based emergency control system that would motivate instead of frighten people.

Included in the system is an Instacart from IGM, a unit that plays recorded messages to direct people to elevators, the floor involved in the emergency and other floors as programmed.

The high rise's control room is located on the first floor of the 37-story structure, in quarters as impregnable as a fortress. To avoid entry by unauthorized persons, doors to the control area open only by electronically coded cards.

A Honeywell Information Systems, Inc. 316 minicomputer controls and monitors the building's fire security and environmental systems. If a generator is low on fuel, an electrical problem develops, an air-handling system shuts down without explanation or a freezer temperature elevates, a CRT displays the trouble point and gives a hard-copy printout with appropriate corrective instructions.

Outside entrances are similarly monitored and warnings appear for such things as doors not fully latched.

When an emergency occurs, the computer calls up on the CRT a silhouette of the building, with a visual picture of the location where the emergency has occurred. The CRT indicates whether it is a fire, smoke, security or mechanical problem and what device triggered the alarm.

On four projection screens in the control center are flashed color-coded schematic drawings of the emergency floor or specific equipment involved. The drawings show the precise layout plus the step-by-step instructions on the proper response to deal with the problem.

Fire Emergency

If the emergency is a fire, the Seattle fire department is notified and told the precise location of the blaze. While the minicomputer is taking care of the above steps, certain relays simultaneously close to actuate the hard-wired portion of the control system, which includes the Instacart's playing of emergency messages.

A master matrix is integrated into the Instacart and, by the use of diode pins, messages are programmed to the appropriate floors.

When a fire alarm is received, all 22 elevators are "captured" and sent to the street floor. A message from an Instacart plays through the speakers in the elevator cabs: "May I have your attention please. The building manager has directed all elevators to the entrance lobby.

"There has been a fire [or emergency, bomb scare or whatever] reported in the building, and the elevators may be needed. Please proceed to the lobby area for further instructions."

Meanwhile, another tape is actuated based on which floor the emergency has occurred. There are three messages on a cartridge in one Instacart tray, separated by suitable cue tones, and one such cartridge for each floor of the building.

If there is a fire on the 16th floor, for example, the first message on the cartridge is played to that floor and the floor below:

"... There has been a fire reported on the 16th floor. While this report is being verified, the building manager would like you to proceed to the stairways and walk down to the 14th floor.

"Wait on the 14th floor for further instructions. Please do not use the elevators ..."

The second message goes to the 17th floor: "... There has been a fire reported on the 16th floor. The 18th floor is a safe area where you should wait for further instructions. Please do not use the elevators ..."

Then the third message is broadcast to the two floors receiving evacuees, in this case the 14th and 18th floors: "... There has been a fire reported on the 16th floor. People from other floors will be entering your area. Please remain at your desks while they are in your area. You are safe in your area."

The reason for the apparent paradox in directing personnel up from a fire is that sudden evacuation of a high-rise structure is impractical. There is the danger of panic and injuries, and the downward rush of people in the stairways would make it impossible for firemen to get upward to extinguish the fire.

Real Bomb Found

Since its installation, the control system has seen actual use, not from fire, but from bomb scares. A bomb was found during one such alert but, fortunately, it failed to explode.

Two special cartridges are played to building personnel for bomb threats or similar emergencies, telling them to either leave the building until the following day or further notice or to go to a nearby structure.

The Honeywell 316 computer performs other yeoman tasks, like starting or stopping fans or closing dampers to pull smoke out of fire areas, while flooding adjacent areas with fresh air to aid firemen.

A reel-to-reel slow-speed audio logging recorder in the Instacart portion of the system records all emergency messages between firefighters or other personnel.

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Show Date Skirmishes Quiet — For Now

By Frank Vaughan
CW Staff

Like the numbers on a wheel of chance at a county fair, next year's autumn microcomputing show dates have spun round and round. For a while, it appeared they might never stop spinning — or worse yet, might cause another season of battling shows in a rerun of the troubles that have plagued the personal computing industry and alientated the user.

The dust has settled and for the present, there are no show conflicts during the months of August, September or October. However, the potential for conflict increases as the show calendar gets increasingly crowded.

The conflicts came to a head this past summer, with the overlapping of dates between the Boston and Atlantic City shows. Then the Chicago and New York shows were scheduled head to head during the last week of October.

Users Ignored

The end user has been almost ignored in all of this. Instead of meeting the needs of the user, many shows have aimed primarily at attracting the largest possible total nose count. When the show doors do open, ticket prices are high and there has generally been less than a full complement of exhibitors.

The list of main participants, each with his own individual causes, is difficult to keep track of, but here is a quick rundown of the principals, in no particular order;

- John Dilks, telephone company employee and prime force behind the past two Atlantic City shows.
- Jim Warren, editor of *Dr. Dobb's Journal of Computer Calisthenics and Orthodontia*, for People's Computer Co., prime force behind the West Coast computer fairs and publisher of *Jim's Industry Notes:*
- Wayne Green, publisher of *73* and *Kilobaud;* the force behind the Boston Show.
- Louise Garcia, employee of Benwill Publishing Co. (*Personal Computing* Magazine), coordinator of the Chicago show.
- Ralph Ianuzzi, employee of H.A. Bruno & Associates, a show company, organizer of the New York show.
- Carl Helmers, editor of *Byte*, which endorsed the New York and Atlantic City shows and was responsible for the technical program in New York.
- Virginia and Manfred Peschke, copublishers of *Byte*.

For a short while it appeared that much of the poor scheduling that has plagued the show circuit would cease to be a problem in 1978. Dilks nailed down the last weekend in August as his "property" for the next few years and much of the industry seems willing to support his Atlantic City venture despite some criticisms of the city and facilities by both vendors and visitors.

The attendee can take heart in the knowledge that Dilks is banking on the hope that the recently approved legalized gambling will pump enough sorely needed money into the city to help it get back on its feet. Dilks has also moved the 78 show out of the Shelburne Hotel and into the convention center.

Green, on the other hand, has made no public announcement of any firm dates for a follow-on to his Boston show. In all probability, should Green decide to hold another show, he will veer away from the autumn months and focus on the spring or early summer dates.

Analysis

Warren announced two West Coast show dates for 1978, one in the spring and the other during the last week of October. He made his show announcement as soon as he established his dates in an attempt to head off any conflicts, also taking advantage of the Atlantic City show to help publicize his dates.

During the Chicago show, Garcia announced that her show dates for 1978 would be moved from the end of October to mid September so as to avoid a conflict with Warren's show on the West Coast.

Then the trouble began.

Ianuzzi found himself completely blocked out of show dates. His agreement with the Coliseum gave him the first option on the last weekend in October, but Warren's show ruled out the use of those dates. He then contacted Warren to see if the West Coast show could be moved.

Warren was able to shift his show to the first weekend in November, hoping that Ianuzzi could move one week in the other direction. The two-week difference in show dates was necessary to permit the exhibitors to truck their exhibits from New York to Los Angeles, as opposed to sending them by air freight, which is reportedly more costly.

Unfortunately, the preceding week was booked at the Coliseum, leaving Ianuzzi out in the cold. He then began looking for other dates and found that the only other week available to him was in mid-September, the same week that, unknown to him, Garcia had booked her show.

Several telephone calls later, the problem was resolved. The Chicago show was moved one week later and the autumn schedule was set.

A current rundown of the autumn shows gives the following: Atlantic City, Aug. 25-27; New York, Sept. 15-17; Chicago, Sept. 21-24 and Los Angeles, Nov. 3-5.

There are still some unknown factors such as Green's plans, the entry of other shows and potential conflicts during the other nine months of the year. In addition, the head-to-head competition between Green's and Peschke's publications, which has spilled over into the show circuit, may create future problems.

The potential is being rapidly diminished, however, by the position *Byte* has taken on show endorsements. "*Byte* is not in the show business nor is it attached to any specific show," Helmers recently pointed out. "*Byte* will only endorse shows which are in the best interests of the industry."

So the autumn show dates are set and all is quiet for now. Yet there is still the possibility that someone will give the "wheel of chance" another spin. That could only harm the user.

Shugart Double-Sided Drive Has Double Density Heads

SUNNYVALE, Calif. — Shugart Associates has announced the availability of a double-sided, double-headed, double-density floppy disk drive that is capable of reading and writing data on both sides of a minifloppy diskette without it having to be removed from the drive.

The SA450 minifloppy drive uses two proprietary glass bonded ferrite ceramic read/write heads in its operation and will store up to four times as much on-line data, or 440K bytes unformatted, as does a conventional single-sided minifloppy drive with a storage capacity of 110K bytes.

The SA450 does this using 35 tracks, the same number as a single-sided drive, a spokesman claimed. These figures are based upon a comparison by the firm with its own SA400 disk drive.

The SA450 can operate in a single-or double-density recording mode on either side of a minifloppy disk. This is made possible through the use of two read/write heads that are mounted in a stainless steel flexure and loaded onto the disk when the drive is operable. Loading time of the heads is 50 msec with an average track-to-track seek time of 25 msec, the firm said. Data can be transferred to or from a disk at the rate of

(Continued on Page 57)

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B

Btam (Basic Telecommunicatins Access Method) — An IBM designation that refers to the use of macro instructions to achieve data communications with specific terminals.

bubble memories — Such memories are actually tiny cylinders of magnetization whose axes lie perpendicular to the plane of the single-crystal sheet that contains them. Magnetic bubbles arise when two magnetic fields are perpendicular to the sheet. A constant field strengthens and fattens the regions of the sheet whose magnetization lies along it. A pulsed field then breaks the strengthened regions into isolated bubbles, which are free to move within the plane of the sheet. Because the presence or absence of bubbles can represent digital information, and because other external fields can manipulate this information, magnetic bubble devices could find uses in future data storage systems.

buffer — A "machine" designed to be inserted between other "machines" or program elements to match impedances, peripheral equipment speeds, to prevent mixed interactions, to supply additional drive or relay capability or simply to delay the rate of information flow. Buffer types are classified as inverting or noninverting.

bug — 1. A program defect or error. Also refers to any circuit fault due to improper design or construction. 2. A mistake or malfunction. 3. An integrated circuit.

bus — 1. As applied to computer technology, one or more conductors used as a path over which information is transmitted. 2. A circuit over which data or power is transmitted. Often one which acts as a common connection among a number of locations (Synonymous with trunk.) 3. A path over which information is transferred from any of several sources to any of several destinations.

byte — An IBM-developed term used to indicate a specific number of consecutive bits treated as a single entity. A byte is most often considered to consist of eight bits, which as a unit can represent one character or two numerals.

byte multiplexing — Refers to a procedure in which time slots on a channel are assigned to individual slow input/output devices so that bytes from one after another can be interlaced on the channel to or from main memory. Such a procedure is used on several IBM 360 and 370 systems.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Club d'Informatique de la Mauricie (Ciam). Contact: S. Brousseau, 3795, Jean-Talon, Trois-Rivieres, Quebec G8Y 2G8. Telephone (819) 375-1019.

CONNECTICUT

Bridgeport Area Society for Involved Computerists (Basic). Contact: Basic, Attn: Al Song, 12 Wildwood Drive, Trumbull, Conn. 06611.

Connecticut Microists. Contact: George Ahmuty, 8711 Wendy Lane, Westport, Conn. 06880. Telephone (302) 227-8534.

FLORIDA

South Florida Computer Group. Contact: Bruce Cameron, P.O. Box 236188, Miami, Fla. 33123. Telephone (305) 324-5572.

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Pocatello Microcomputer Club. Contact Dr. Joel Shecter, Idaho State University, Box 8020, Pocatello, Idaho 83209. Telephone (208) 236-3730, 236-3585.

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Greater Boston Computer Group (GBCG). Contact: Vin Moscaritollo, 59 Bellvu Road, West Roxbury, Mass. 02135. Telephone (617) 325-2155.

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Mid-Michigan Computer Club. Contact: Tony Preston, 15151 Ripple Drive, Linden, Mich. 48451. Telephone (313) 735-5279.

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Minnesota Computer Society. Contact: Jean Rice, Box 35317, Minneapolis, Minn. 55435. New telephone (612) 941-1051.

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Northern Nevada Amateur Computer Club. Contact: A. Brady, c/o UNSCC, P.O. Box 9068, Reno, Nev. 89507.

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Amateur Computer Group of New Jersey. Contact: Sol Libes, 995 Chimney Ridge, Springfield, N.J. 07081. Telephone (201) 277-2063.

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Ithaca Computer Group. Contact: S. Edelman, Box 91, Ithaca, N.Y. 14850. Telephone (607) 273-3271.

Westchester-Fairfield Amateur Computer Society. Contact: C.B. Hensley, R.R. 1, Pound Ridge, N.Y. 10576. Telephone (914) 764-4213.

Long Island Computer Association. Contact: Aileen Harrison, 36 Irene Lane East, Plainview, N.Y. 11803. Telephone (516) 938-6769.

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Triangle Area Computer Club (Tacc). Contact: Ed Comer, 4818 Ferncrest Drive, Greensboro, N.C. 27410. Telephone Andy Pitts (919) 765-1277.

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Pittsburgh Area Computer Club. Contact: Fred Kitman, 216 Beech St., Pittsburgh, Pa. 15218.

WEST VIRGINIA

West Virginia Computer Society. Contact: Bill England, 167 Iroquois Trail, Ona, W. Va. 25545.

Oliver Offering Prom Systems

GLENDALE, Calif. – A series of piggyback programmable read-only memory (Prom) programmers that reportedly plug directly into any 2708 or TMS-2716 memory socket are available from Oliver Audio Engineering, Inc.

The Prom to be programmed is placed in the zero insertion force socket and the data is dumped over the eight lower address lines using a proprietary interface technique, the firm said.

No additional power supplies are needed and all timing and control sequences are handled by the programmer, a spokesman added.

Each unit comes with a dc-to-dc switching regulator, 10-turn cermet trimmers for voltage and pulse width alignment and a zero insertion force socket. A 5-ft ribbon cable connects the programmer with the Prom socket via a 24-pin plug, the spokesman said.

Packaged in an aluminum case, the unit sells for $249 in kit form and $295 assembled, tested and aligned from Oliver Audio Engineering at 676 W. Wilson Ave., Glendale, Calif. 91230.

Shugart Adds Minifloppy

(Continued from Page 55)

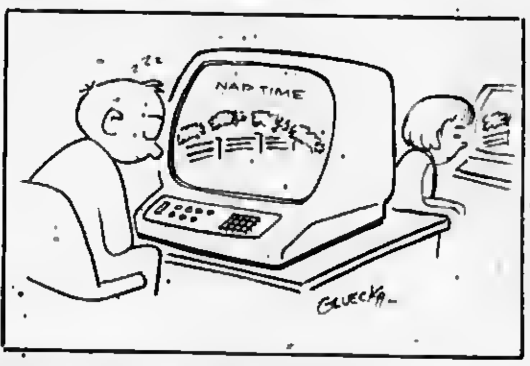
125 or 250 kbit/sec, depending on the density selected, it added.

The read/write assembly maintains its position while in operation through the use of a spiral cam. This cam incorporates a V-groove that is fitted with a ball bearing follower attached to the head carriage assembly. When accessed, the cam, driven by a stepping motor, rotates in precise increments to the assigned track location on the minifloppy disk, the firm said.

The SA450 uses a 5.25-in. double-sided minifloppy media the same size as that of a single-sided disk. These disks are manufactured in three forms: soft-sectored, hard-sectored with 16 holes or hard-sectored with 10 holes.

An activity light and a write protect circuitry are standard features of the disk unit.

Price for the SA450 is $450 with delivery in 90 days. OEM discounts are also available Shugart Associates said from 415 Oakmead Pkwy., Sunnyvale, Calif. 94086.



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CW at CCIA

With Rapid Changes

User Decisions Seen Harder Than Ever

By E. Drake Lundell Jr.
CW Staff

LOS ANGELES — Rapid technological changes in the last few years are making it harder than ever for users to make the right decisions on equipment and services, according to Stanley Mantell, vice-president of Input, a market research firm.

Speaking at the Computer & Communications Industry Association annual meeting here, Mantell added that "most users don't have all the in-house resources necessary" to make those decisions in the rapidly changing environment.

Some of the issues that face, and apparently perplex, many users include the move to distributed processing, the new price/performance of large mainframes, developments in the area of hardware/firmware/software, data base management systems and new communications alternatives such as value-added networks, Mantell said.

In the area of distributed processing, Mantell said users have to grapple with an issue that is not solely technical, but rather one that is "a strong emotional issue with many companies."

Users have to decide between distributed processing with centralized control and decentralized processing with decentralized control, he indicated.

But at the same time, Mantell said the centralization of DP resources is still being encouraged by large mainframers and their latest systems.

In just the last two years, he noted, the price/performance of systems has improved fourfold, with the new 30 series from IBM having four times the power of the 168-3, introduced just two years ago.

Along with this increase in performance for the same price, users saw the residual value of their large systems drop as much as 30%, he said, noting that this created a confusing situation for users to evaluate.

And in the future, Mantell predicted that this rate of price/performance improvement could even increase, particularly as Japanese firms enter the U.S. market in the 1980s.

Another factor contributing to user confusions is the strong growth of the nontechnical DP

(Continued on Page 60)

Communications Industry Charged With Lack of Systems Creativity

LOS ANGELES — "With a few notable exceptions, the communications industry has not been known for particularly creative systems thinking," Dr. George E. Mueller, chairman of System Development Corp., told the Computer & Communications Industry Association meeting here last week.

The industry and users of communications services are generally concerned with problems, "usually to the exclusion of opportunities," Mueller told the more than 60 industry executives attending the session.

At the same time; however; Mueller charged that the industry has been "concentrating far too much on what is efficient — almost to the exclusion of basic human motivations."

And so to meet the needs of the future in communications, the industry and users need to be more creative, and "that creativity must be based on a deeper perception of what people really want," Mueller said.

Mueller pointed out that "at great expense, our cities have been completely wired" and while they may not have been wired the way it would be done today "certainly no one proposes that we rewire them."

The resource, therefore, is there, he said, if it would only be used creatively by the people in the industry and users.

However, most of the "touted" communications developments of the past decades have really not been developments but rather "artifacts of an earlier era," Mueller charged.

For example, automatic telephone dialing was invented by an undertaker in 1915 and facsimile transmission has been around since the '30s, he said.

"Nor am I convinced that some of the improvements are really improvements when you get right down to it," he added.

"The automatic PBX, for exam-

(Continued on Page 60)

Federal Computer Base Grows 5.5%

By Molly Upton
CW Staff

WALTHAM, Mass. — The number of general management computers installed in the U.S. government in fiscal 1976 grew 5.5% to 3,829, easily outpacing the total U.S. general-purpose industry's actual 1% decline in units installed, according to International Data Corp.'s *EDP Industry Report* (EDP/IR) newsletter.

The growth rate was the highest for the government since the late 1960s, according to the market research firm here.

The government seems to lean toward large units; IDC calculated the price per system at nearly $1.5 million. Government net expenditures on general management computers, whose definition is basically the same as that of IDC's general-purpose category, totaled $290 million, according to the firm.

Including special management systems — minicomputers and dedicated application computers and "all other computer-based systems used in various operational environments" — the government's installed base of computers reached 9,650 units, an 11.5% rise over the fiscal 1975 total, according to the newsletter.

But the value of the government inventory rose only 9% to $4.41 billion, IDC said, using figures derived from the General Services Administration's "Inventory of Automatic Data Processing Equipment in the U.S. Government."

The unit growth rate of 11.5% in the federal government installed base was less than half that of the total computer industry growth rate, according to EDP/IR.

IDC attributed the lag to the frenetic 32% rate at which minicomputers are being installed in the industry sector, where they now comprise 70% of

(Continued on Page 60)

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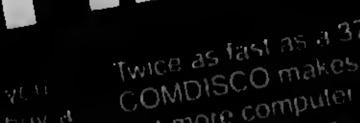

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Communications Industry Told to Be Creative

(Continued from Page 59)

ple, has simply replaced a person who knew where people were with a machine that doesn't," he noted.

Truly innovative services, he said, always seem to stay on the drawing boards and "never quite make it to the marketplace where they are so badly needed," he said.

Today the business is faced with a "great revolution in the way men communicate," he said.

'Mind-Boggling' Impact

"Businesses are just barely beginning to exploit computer-controlled communications networks, but you all know what these tentative beginnings have meant to the communications industry already. When the revolution extends to the general public, the impact will reach mind-boggling proportions," he said.

"Yet it might not happen," he warned, since "the communications industry, which would be the primary beneficiary of such a revolution, may well be the force that suppresses it."

As an example of how this might happen, Mueller pointed to the furor over the data encryption standard.

"Incredibly, we have become embroiled in a controversy over whether the key is long enough," he said.

Becuase of the controversy, "there is a real danger that the standard won't be widely used," even though it is the best available and is "certainly more than adequate" for most users, he continued.

"Such hesitation could actually slow the growth of the communications industry," since some firms may withhold some business functions from computer communications systems because they think they are not protected enough.

"If a corporation is 'forced' to withhold some functions," how can we reasonably expect it to be enthusiastic about investing in a broad computer-controlled network linking all its facilities and organizations?" he asked.

Furthermore, worry over the standard may prevent the development of some new innovative applications.

One of the reasons for not doing more creative work in the area of communications is that such services might run afoul of the 1934 Communications Act, he said.

But while admitting that there "is risk," Mueller said "the laws" currently on the books "simply are not relevant to the revolution we are anticipating" and that there are "no laws that prohibit us from being creative."

But that creativity "must be based on a deeper perception of what people really want," he added.

The whole CB revolution shows that people have "a desire for much better and freer personal interaction than we have now," he said, adding "I also think it reveals a desire for such interaction with more than one person at a time.

"These needs must be satisfied in some manner," Mueller concluded.

"And it will take far greater creativity and innovation than has been evidenced heretofore. The communications industry must not follow the pattern of the railroad industry, simply developing newer Pullman cars. Such a passive approach would not only depress the industry, it would deny, or at least significantly delay, a revolution in the way man lives and works."

Changes Making User Decisions Tougher

(Continued from Page 59)

user, Mantell said.

With the development and strong growth of management information systems and data base management systems, general management without a computer background is becoming more and more involved with systems, he said.

These people have less time and patience to spend with the systems, he said, and therefore systems have to be developed to allow them to communicate easily with computers.

Another factor in the user confusion equation is the growth of network architectures, he indicated, since with such things as Systems Network Architecture from IBM there is a migration of computing capabilities out of the host computers into communications controllers and even into terminals themselves.

And similarly, there is a move to more firmware in systems that Mantell predicted would evantually lead to processors that are developed for only one function or industry.

The increasing use of firmware can be seen with the IBM VM assist and MVS system Extensions operating systems he said, adding there are already industry-specific functional processors for the seismic DP field.

As this trend continues, it will raise a number of issues, because such systems would have a great deal of impact on user software that is already in place.

In addition, such developments also tend to support a centralized computer philosophy, he said, and the integration of more functions into firmware will serve as a barrier to competition "to some degree."

With increasing use of firmware in the systems, the problem of program portability will become even greater than it is today, he added, noting that such a move would impact both systems and applications packages that are either user- or industry-developed.

Communications Use

The growth in the use of communications is also a factor contributing to user confusion, Mantell said.

On the one hand the use of local intelligence in terminals and the like reduces the cost of communications, but at the same time the total communications costs are going up in many firms, he said.

But in the future, if communications cost drop, cheap communications could be a factor driving firms toward centralized DP, he added.

At the same time, the increased use of communications will push toward a move to provide more office automation and to combine word and data processing systems into one large network, he indicated.

Little has been done to automate the office to date, Mantell said, even though a great deal of automation has taken place in the factory. Because of this there is a great deal of opportunity in this area for increased labor efficiency, he added.

Overall, Mantell said users are now entering the age of cheap computer power which will give them more choices in the future. At the same time the split in the market between DP, communications and office function "will no longer hold" as those functions become integrated.

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Federal Systems Increase 5.5%

(Continued from Page 59)

the unit base.

Including minis, computers in the government are growing at only a 10% to 11% rate, "which means they are rapidly decreasing (over 10% annually) in number relative to the total U.S. installed base," EDP/IR observed.

Similarly, the 8% to 9% rate of growth in installed value means the government's inventory "is slowly (less than 1% annually) decreasing relative to the total U.S. installed value," the newsletter said.

In fiscal 1976, the number of special management computers in the government rose 16% to 5,819, while general management computers grew 5.5% to 3,829.

The value of general management computers installed in the government rose over 10% in fiscal 1976 to $3.18 billion, EDP/IR said.

The government's position of predominance as a user is still unchallenged, but is dwindling. IDC indicated the government holds just under 4% of the U.S. installed base of all computers in fiscal 1976, down from 8.4% in 1970.

However, the government continued to account for 11% of the installed value, down from 13% in 1970.

Ended in Bankruptcy

Dallas Firm Had Hard Ride During 1969 Ups, Downs

By Molly Upton
CW Staff

The history of Scientific Control Corp., a Dallas firm whose stock rose as high as $68 a share, is reminiscent of a roller coaster and brings to mind the heyday of the late '60s and then the hard times of the early '70s.

On paper, Scientific Control Corp. (SCC) seemed to have almost everything — a large time-sharing system that reportedly could serve 265 users simultaneously, a 16-bit minicomputer oriented to real-time scientific and control applications and the DCT-132, an internally programmable remote-batch terminal.

During the late '60s, firms were sprouting up right and left, and stock analysts were hard pressed to gather firsthand knowledge of firms.

Stockholders of SCC later sued Merrill Lynch, Pierce, Fenner & Smith, Inc. for stock manipulation and won $1.5 million.

Recently the Securities and Exchange Commission (SEC) censured the brokerage firm and some employees and ordered it to reimburse customers another $100,000.

SCC began public trading in December 1967, when its stock was about $7.50 a share. In retrospect, the firm was perhaps best known for its strong earnings projections — which more often than not somehow failed to materialize.

Losses soon eclipsed the projections and a downhill slide began, involving bankruptcy and financing from a subsidiary of the Penn Central.

Exactly what happened to SCC is unknown to *Computerworld*, which up until 1970 followed the firm with a sizable amount of ink. The saga of SCC, as reported in CW, follows.

In September 1968, the firm signed a $2.5 million contract with Electronic Memories, Inc. for core memory stacks to be used in its SCC 4700, a 16-bit computer designed for real-time scientific and control applications.

Picture in '69

Things were looking bright the first part of 1969.

The firm announced its first customer for its Model 6700 time-sharing computer in January 1969. The customer of the $2 million contract was Information Industries, Inc., SCC said. The 6700 could serve 265 users simultaneously at a rate of 5,000 instructions per second.

In May, the firm announced its DCT-132 internally programmable remote terminal, which SCC said could be compatible with all computers and handle data transmission up to 4,800 bit/sec. The basic system consisted of a controller, card reader, line printer and coupler for a modem.

As late as August, the firm's President William C. Lee was reaffirming SCC's earlier sales projections of more than $20 million for fiscal 1970.

Between June and August, the firm announced sales to four customers of more than $11.2 million in computers and communications equipment.

In August, SCC sold 100 of its DCT-132s for a value of $2.4 million to one customer. The firm said its aggregate backlog was $17.7 million.

Mentioning the $2.4 million contract as well as another one for $2.27 million, Lee stated, "As these two sales demonstrate, our forecast of tripling sales from 1969's $7 million level was extremely conservative."

Losses Grew

But in October, it became apparent that losses were growing.

For the year ended April 30, 1969, the firm showed a loss of $1.6 million on revenues of $6.9 million compared with a $21,755 loss in 1968 when revenues were nearly $4 million.

And the pace at which losses accumulated quickened. In the following quarter ended July 31, 1969, losses grew to $1.6 million on $2.5 million in revenue compared with a $69,499 loss in the same period in 1968, when revenues were $2.2 million.

The annual report, which appeared in October, said much of the year's loss was attributable to expenditures of $1.3 million on product development and $1.2 million on a marketing team.

During the year, the firm had acquired a maker of cabinets and signed an agreement in principle to acquire Graham Magnetics, Inc.

The firm was also constructing an 80,000 sq ft addition and had expanded its number of employees from 285 to more than 830.

Things got worse.

In November, the firm laid off about 25% of its work force and filed suit against Commercial Credit Business Loans, Inc. and its parent company, Control Data Corp., charging them with breach of contract and fraud.

The suit was prompted by a notice from Commercial Credit that it would not consummate a $4.5 million loan that had been previously agreed upon, SCC indicated.

SCC sought a total of $41 million in damages and indicated it was no longer considering granting to Commercial Credit or CDC a license to manufacture and market its DCT-132. The license was to have been granted in connection with the loan.

Chapter 11

In late November, SCC sought the shelter of Chapter 11 of the bankruptcy laws, by which it would be granted protection from creditors while formulating a plan to pay its debts. Among its creditors was Graham Magnetics, which held a $1 million unsecured note.

SCC's stock fell to about $12 a share.

Then in December, the firm settled its lawsuit with CDC and Commercial Credit, receiving a cash advance in the "hundreds of thousands" of dollars. The suits were dropped and Commercial Credit relinquished a license to manufacture and sell the DCT-132.

SCC closed its doors, unable to pay $200,000 in back wages to about 600 employees.

The year 1970 was spent trying to get out from under.

Under the bankruptcy plan, SCC would issue 2 million shares of its common to Great Southwest Corp., a land developer that was 80% owned by Penn Central, in return for $2 million.

Great Southwest would acquire just over 50% of SCC's shares, according to the plan.

Ernest E. Specks, new secretary of SCC, indicated the firm received many offers to buy its assets but accepted none. The firm had assets of $13.4 million and debts of $11 million including $7.1 million in claims of unsecured creditors, he said.

Meanwhile, stockholders had filed suit against Merrill Lynch.

In January, SCC reopened its doors with a smaller staff. The firm told the court it shipped $653,000 worth of products during the first 12 days of renewed operations.

However, all was not well, as became apparent in November 1970 when Great Southwest's liquidity problems came to light.

SCC announced it had reduced its workforce to a skeleton crew of 10 to 20 in the engineering, manufacturing and accounting departments.

Harris Intertype Corp. took a quick look at SCC, but managed to escape, complete with its $100,000 loan.

Although the Great Southwest reorganization enabled SCC to reduce its debt by about $2.1 million, its debt reduction "correspondingly reduced the working capital available to Scientific Control," SCC said.

After 1970, SCC ran out of ink.

Merrill Lynch to Pay Up

WASHINGTON, D.C. — The Securities and Exchange Commission (SEC) ordered Merrill Lynch, Pierce, Fenner & Smith, Inc. to repay customers up to $1.6 million for losses on a computer maker's stock the SEC said was recommended in the late '60s without sufficient investigation.

The amount includes $1.45 million that the brokerage firm previously had agreed to pay in settlement of a class action suit by stockholders of the firm, Scientific Control Corp. (SCC), Merrill Lynch stated.

SEC estimated Merrill Lynch customers bought about 400,000 shares, or nearly 33% of the total outstanding SCC stock, and incurred losses of more than $9 million.

SCC's stock had reached $68, but then dropped to about $12 as the firm's true financial picture came to light.

Consent Order

The SEC's consent order found the firm had violated antifraud and other aspects of the federal securities law by rcommending the stock to its customers. The SEC censured the firm and 22 employees and penalized seven others.

Merrill Lynch and the employees involved consented to the action without admitting or denying the commission's allegations.

According to the charges, the employee responsible for following SCC's stock did not scrutinize company earning projections.

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Cray Losses Expected

BLOOMINGTON, Minn. — The losses posted by Cray Research, Inc. in the third quarter and nine months were in line with expectations, according to the firm, which said it has incurred increased overhead for expanded production, marketing and installation activities.

Losses are expected to diminish during the fourth quarter as newly installed systems begin to produce revenues, the firm indicated.

During the quarter, the firm reported revenues of $533,761 compared with none last year. The loss was $867,379 or 61 cents a share compared with a loss of $415,573 in the same period last year.

For the nine months, revenues totaled $1.6 million compared with none and the loss was nearly $1.99 million or $1.41 a share compared with a loss of $995,521 or 83 cents a share in the year-ago period.

During the third quarter, a Cray-1 system valued at over $8 million was installed at the National Center for Atmospheric Research.

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Data 100 Revenues Grow In Quarter, Nine Months

MINNEAPOLIS — Data 100 Corp.'s operating income in the third quarter and nine months rose compared with the year-ago periods.

Before extraordinary income, the quarter results showed $823,000 compared with $774,000 in the 1976 quarter while revenues grew to $34.6 million compared with $30.2 million.

Earnings, including a $183,000 tax credit, totaled $1 million or 20 cents a share compared with $1. million or 28 cents a share in the same quarter last year, when there was a $373,000 tax credit.

For the nine months, revenues grew to nearly $97 million compared with $87.9 million a year ago.

Operating income totaled $3.1 million compared with $2.7 million, but earnings were less because of a smaller tax credit.

During the nine months, Data 100 earned $3.6 million or 76 cents a share, including a $478,000 tax credit, compared with $3.5 million or 88 cents a share including an $858,000 tax credit in the same period last year.

Revenues included nonrecourse sales to third-party lessors of $4.2 million in the quarter compared with $5.4 million in last year's quarter and $13.1 million in the nine months compared with $13.8 million for the 1976 period.

Financial News

Total net shipments, including equipment sold to other manufacturers, reached $28.5 million in sales value compared with $22.9 million in the third quarter a year ago.

Net terminal shipments in the quarter reached $23.2 million at retail sales value compared with $20.1 million in the same period a year ago.

Quarter Net Jumps at DEC

MAYNARD, Mass. — Digital Equipment Corp.'s first-quarter earnings grew to nearly $26.4 million or 66 cents a share from $16.7 million or 43 cents a share in the same period last year.

Revenues rose 48% to $302.6 million from $204.5 million in the same period last year. Equipment sales contributed almost $238 million compared with the year-ago figure of $160 million.

The company said the major build-up in its manufacturing capacity, which had a positive influence on first-quarter performance, resulted in shortened delivery times to customers.

Despite the high level of expense associated with plant startups and the rapid integration of the new manufacturing facilities, productivity gains were achieved which were reflected in the earnings increase and improved profit margins over the comparable period a year ago, a spokesman said.

Telex Quarter Results Soar

TULSA, Okla. — Telex Corp.'s second-quarter earnings soared compared with those of the year-ago period, totaling $2.8 million or 26 cents a share compared with $434,000 or 4 cents a share in the 1976 quarter.

The tax credits were $1.5 million in this year's period compared with $270,000 a year ago.

Revenues for the quarter ended Sept. 30 rose to nearly $38 million compared with $22.8 million in the same period last year.

For the six months, revenues totaled $70 million compared with $47.4 million for the same half-year period last year.

Earnings were $4.4 million or 41 cents a share, including $2.5 million in tax credits, compared with $1.6 million or 15 cents a share, including a $709,000 tax credit, in the 1976 period.

Nickels & Dimes

Wang will dispense quarterly dividends of 1 cent a share on common stock and 3-1/2 cents on share on class B common on Jan. 27 to holders of record Dec. 9.

$ $ $

Computer Sciences Corp. shareholders approved repurchase of 1.5 million shares of its common from the Jones Foundation, an expense of about $11.6 million.

$ $ $

Applied Digital Data Systems, Inc. said it has bought 160,000 of its common shares from Richard Kaufman, a founder and vice-president, and from his family trusts.

$ $ $

Pertec Computer Corp. began trading on the New York Stock Exchange under the symbol PCC.

Automatic Data Processing directors have okayed the firm's purchase of up to 75,000 shares of common for its employees' savings stock purchase plan. The purchases will be made from time to time.

$ $ $

Technalysis, a computer consulting firm, is offering to purchase 45,000 of its common stock at $4 per share until Nov. 30 in order to avoid SEC red tape by reducing its number of stockholders to less than 500.

$ $ $

Sykes Datatronics new banking agreement provides it with up to $1.7 million in long-term funds. The firm called in the $600,000 in convertible debentures which should eliminate the 25% dilution that would have occurred had the debentures been converted.

Shipment Date Uncertain

Diablo Still Working on Series 400 Drives

By Molly Upton
CW Staff

HAYWARD, Calif. — Diablo Systems, Inc. is laboring over the birth of its 400 series of disk drives, which have yet to make an appearance.

The drives, ranging in size from 13.3M bytes to 53M bytes, were announced in 1975 and originally scheduled to be shipped in the first quarter of 1977. Shipment was later postponed to the last quarter [CW, June 13].

It is now November, and Ridley Rhind, vice-president of marketing for the Xerox subsidiary, said in an interview recently that he was unable to give a projected date for the 400's shipment.

"We are heavily dependent on disk drives and are working hard on the 400," Rhind stated. "We're just not ready to ship it," he added.

The 400s are basically 3330-type units and do not incorporate Winchester technology. Rhind said Diablo, a Xerox subsidiary, does not itself expect to venture into Winchester technology. "It would be inconsistent with our philosophy of removable packs," he said.

However, Xerox is about to acquire Shugart Associates, Inc., which makes floppy drives and has its own heads.

Diablo has converted nearly 100% of its customers of its 44A 10M-byte disk drive to the newer, lower cost version, the 44B, which included more options, Rhind said.

Conversion of customers "became a real challenge," he said, "because if you're going to provoke them to look at a new drive, they're going to look at other offerings as well.

"I'm very proud we haven't lost anyone," he said.

Printer Shipments

Looking at printers, the other major aspect of Diablo's business, Rhind said the printer business is doubling each year. "It's a fantastic growth business," he indicated. The firm is shipping about 3,000 daisy wheel printers a month, he added.

In 1976, disks accounted for about 60% of Diablo's business, but that ratio has probably shifted to 30%, with printers climbing to 60% and small business systems to 5%.

However, Rhind indicated he does not see this as a trend. Next year the firm's small business system, the 3200, marketed by General Business Systems, should represent about 15%, he indicated.

Previously, Diablo viewed printers and terminals as two separate product lines, but that has changed with the advent of microprocessors, he said. There is an 8080 in each unit.

Diablo uses 16K memory chips, and Rhind admitted it would be possible to insert up to 32K without much problem.

However, he said the firm has all the products it needs to support its very rapid growth rate, and the pressure is not for new products but to build and ship the models it has.

The firm offers models with daisy wheels printing at 45 char./sec in both plastic and metal, as well as a 200 char./sec 9 by 7 dot matrix print head that fits in the existing chassis, he said.

Basically, Diablo wanted to offer a range of speed and technology, although the matrix unit is admittedly higher priced than those units designed specifically for matrix printing, such as the ones from Digital Equipment Corp., he said.

Rhind said he thinks the prejudice against matrix printers resulted from the print quality of a 5 by 7 matrix. But Diablo's unit has a 9 by 7 matrix, so he expects it will gain acceptance, especially with its feature that allows it to operate at half speed, 100 char./sec, with high resolution.

Executive Corner

WOODLAND HILLS, Calif. — Dataproducts Corp. has established a new position, executive vice-president, to whom various executives will report instead of to President Graham Tyson.

Robert G. Bartizal has been named executive vice-president of the firm's printer and memory business. All engineering, manufacturing, marketing and support functions for these activities will report to him.

Other Moves

- Thomas A. Sherby, formerly senior vice-president of operations at Dataproducts Corp., has been named senior vice-president, systems and equipment group at Fairchild Camera & Instrument Corp. That group handles federal systems, industrial products, instrumentation system and video products.
- Michael G. Salter has been appointed director of OEM marketing for Raytheon Data Systems Co.
- J. Roy Henry was named vice-president, marketing of Burroughs Corp. Jack W. O'Leary was appointed general manager and group executive of the office products group, succeeding Henry.
- David C. Roberts has been promoted to director of the technical staff of Compusource Corp.
- Martin J. Chizzick has been appointed director of administration for the Field Operations Divison of Storage Technology Corp.
- Dr. Joseph J. Sisco, President of American University of Washington, D.C., has been elected a director of Raytheon Co., Lexington, Mass.
- Joseph R. Leonardi has joined Pertec Computer Corp.'s Data Sytems Operations Division as division vice-president, engineering.
- Joseph R. Creighton, head of the legal department of Harris Corp., has been elected vice-president of communication and information handling equipment. William LeMasters, the company's controller, was also named vice-president as was Robert E. Sullivan, the company's treasurer.
- Thomas D. Purtell has been promoted to director of marketing for disk products of Storage Technology Corp.
- Robert E. Reed has been appointed national marketing manager for the Computer Systems Division of Anderson Jacobson, Inc.
- Ronald L. McKinney has been promoted to vice-president of Cullinane Corp.
- H. Robert Blanding has been appointed director of engineering and John S. Connolly has been named OEM sales manager of Cambridge Memories, Inc.
- John W. Kjos has been named director of marketing at Interscience Systems, Inc.
- Stan Pessok has been appointed to the newly created position of director of manufacturing at Shugart Associates.
- Kenneth Ritchin has been named director of facility planning for Medicus Systems Corp. and will be based in the company's Elmsford, N.Y. office.
- Dr. L. William Katz has been appointed a vice-president of Medicus Systems Corp.
- Tom Hinkelman has been appointed the first full-time executive director of the Semiconductor Industry Association.
- Don Kildebeck has been named to the position of director of manufacturing at Dataflux Corp.
- Gene Hnatek has been named to the newly created position of manager of sales and marketing support at Monolithic Memories, Inc.
- Richard D. Joyce has joined Harris Corp.'s Data Communications Division as vice-president of product development.
- Richard F. Mock has been named vice-president, federal systems operation of Univac's Worldwide Marketing & Services Organization. Dewaine L. Osman was appointed vice-president, eastern operations (U.S.).
- John F. Smith has been promoted to vice-president of manufacturing for Digital Equipment Corp.
- Thomas S. Benson has been elected to the position of vice-president, business development, a new position, at Electronics Memories & Magnetics Corp.
- James B. Duke has been appointed to the post of director of international marketing for NBI.
- Orren Y. Evans, president of TRES Computer Systems, Inc., has announced the election of several vice presidents to the new position of senior vice-president: Barnell Albers, customer systems and services; Bob D. Collins, construction and materials systems and services; Marvin D. Friedman, marketing; Robert O. Gaston, financial, employee and engineering systems and services; and Bill C. Sherwin, finance treasurer and secretary.
- Daniel Riordan has been appointed as European business manager of the business distributor product line at Digital Equipment Corp.

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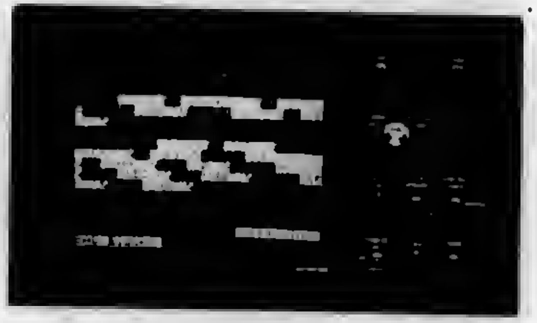

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Probers Charge Mass. Backdated CDC Contract

By Tim Scannell
CW Staff

BOSTON — State officials here allegedly signed and then backdated a $166,000 contract with Control Data Corp. for increased computer capabilities at the Registry of Motor Vehicles in direct violation of state law.

The alleged violation of law in connection with the state's merit rating auto insurance system was reported by station WBZ-TV after an investigation by its news department.

The merit rating plan passed by the state legislature is a system for setting insurance rates that penalize bad drivers. with surcharges; the surcharges subsidize the rates of good drivers.

The contract was signed in late May and then backdated to March 31, when CDC employees actually began to upgrade the present CDC 3300 system software, according to the WBZ-TV investigators.

Frank M. Connolly, then acting director of the Merit Rating Board, told the investigators he was ordered to sign the contract on May 26. However, when a copy of the contract came back from the state comptroller's office, it was dated March 31. Connolly did not become acting director until that May.

When he questioned the discrepancy between the date that appeared on the contract and the date on which he had signed it, he said he was informed by the comptroller's office that it didn't make any difference what date was stamped on the form.

Other Signatures

Two other names were also signed on the backdated contract. One was that of Secretary of Public Safety Charles Barry, who said that such methods are not unusual in cases where a particular program has to be developed and operational by a certain date.

Barry contended that the board approved the contract and that CDC was working prior to the time the contract was formally assigned in order to meet an October-November deadline.

The other name signed on the contract was that of Secretary of Administration and Finance John Buckley. Buckley told the TV investigators his concern as well as that of the Merit Rating Board, the Secretary of Public Safety and the governor's office was focused on implementation of the system improvements and the problem of getting the operation started.

On July 8, the Merit Rating Board met again to discuss the matter of CDC's work and the payment due the company. It was then that Daniel Jaffe, the assistant attorney general and the rating board member, questioned the legality of the contract.

Jaffe repeatedly warned the board the document had been in violation of state law since its inception, the TV station said.

According to Jaffe's version of what occurred at the July 8 meeting, he informed Peter Tropp, an aide to Gov. Michael S. Dukakis, that the contract was illegally backdated and that it would permit an unauthorized expenditure of Merit Rating Board funds.

However, Insurance Commissioner James M. Stone and newly appointed Registrar Alan Mackey voted at that meeting and at a subsequent meeting held on July 22 to begin paying CDC effective April 1 to avoid failure of the merit system. They stated that although the board recognized that a problem did exist, appropriate persons working in conjunction with the attorney general's office should recommend to the board a legal means for CDC to be paid.

The final result was a new contract dated Aug. 1. Although it resembled the old backdated document, its wording is slightly different and allows CDC to be paid for work it had started without official authorization.

Supershorts

NCR Corp. will supply the Trans Canada Telephone System network interface machines for the Canadian Datapac network. Under the pact, NCR will provide data communications hardware and software for a processor which provides the Standard Network Access Protocol (Snap) link to the network.

— — —

Compuscan, Inc. has inked a pact with Equico Lessors, Inc., a subsidiary of the Equitable Life Assurance Society, under which Compuscan will offer users a variety of lease plans that will be financed by Equico. The agreement calls for up to $15 million in lease financing over the next five years.

— — —

The Wharton School of the University of Pennsylvania will offer a course on "Foreign Market Entry Strategies" in four cities around the country next spring. Further information is available from Department 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

— — —

In this country, Sycor has signed a $24 million revolving credit agreement with its banks, which include the First National Bank of Boston, the Central National Bank of Cleveland, Citibank N.A., Chemical Bank, City National Bank of Detroit, Detroit Bank and Trust and Manufacturers National Bank of Detroit.

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University of California, Berkeley. $1683-2031. Design, develop, and implement large and medium scale computer systems for handling bibliographic data. Chief Programmer for team of programmers. Participate in the development and implementation of, design and documentation standards. Prepare analysis of complex problems in processing large files of variable data and specifications for vendor services. Mgt. Support. MINIMUM QUALIFICATIONS: Graduation from college with major in an appropriate field and 4 years of programming experience; or equivalent combination of education and experience. ADDITIONAL QUALIFICATIONS: Several years PL/1 or combination PL/1 and IBM 360/370 high level language or Assembler and substantial structured/top down system design; experience supervising a program team comprised of at least 2 programmers. Significant experience in either 1) Library MARC-record file processing 2) Library Authority Control or 3) Data base design and management is essential. Demonstrated success in PL/1 structured program techniques using HIPO design & documentation format. Apply to: Personnel Office, Box 329-33, 2539 Channing Way, Berkeley, Calif. 94720. Equal Opportunity/Affirmative Action Employer Closes 12/16/77.

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SORBUS INC., a leader in EDP equipment maintenance, has immediate openings nationwide for highly skilled Field Engineering professionals.

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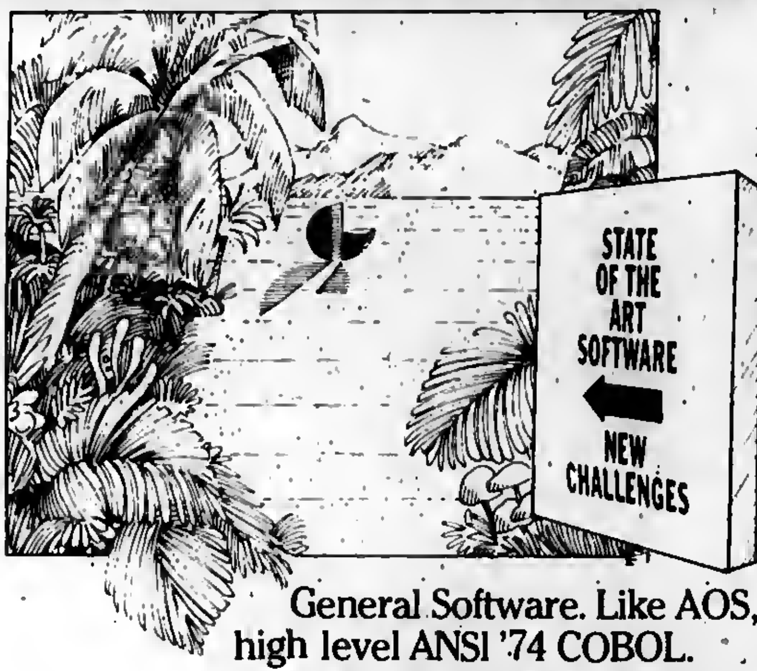

Naturally you're parched. Too much of the software you're working with has gone old, stale and dry. But now's your chance to work with some of the most advanced software in the world. Data General Software. Like AOS, Idea, INFOS and high level ANSI '74 COBOL.

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SYSTEMS PROGRAMMERS to work with S/370-158 & VTAM, TSO, IMS-VS in a VSII environment that will be going to MVS in 1978.

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CSC

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CSC's System Sciences Division deals with space sciences programming and analysis for complex projects and we have created new openings for professionals with a Bachelor's or advanced degree in Computer Science, Math, Physics, Meteorology, Astronomy, or Engineering.

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These projects are in support of our Space Tracking Data Network, Goddard Real-Time Systems and On/Off Site Projects with the NASA Goddard Space Flight Center.

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Staffing Department
Toll Free: (800) 638-0842 OR Call Collect: (301) 589-1545

COMPUTER SCIENCES CORPORATION

System Sciences Division
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E-Systems is a fast-growing, $320-million company involved in high technology electronic systems and in aircraft maintenance and modification.

We're located in Garland, Texas, a convenient suburb of Dallas. So, in addition to a challenging working environment, we can offer good schools, no state personal income tax, the lowest housing costs of the top ten major metropolitan areas, and year-round outdoor activities. We offer a unique combination of an exciting, challenging career opportunity and an excellent place to live. Currently, we're searching for:

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SENIOR RF ENGINEERS BSEE, MSEE, 5-15 years background in broadband RF subsystem design. Experience in scanning superheat receiver techniques (P-band through Ku-band) including amplitude and phase tracking design, analysis of receiver sensitivity and dynamic range required. Experience in RF component design include microcircuit integrated circuits (MIC) is desirable.

SYSTEM ANALYSTS BSEE, MSEE, PhD, with 5 or more years background in radar reconnaissance applications with emphasis in system design, simulation, and analysis. Experience should include system performance requirements analysis and using mathematical models and computational methods for system simulation and system performance evaluation.

SYSTEM ENGINEERS BSEE, MSEE, PhD with 2 or more years of background in radar reconnaissance applications with emphasis in system requirements analysis and system design and testing. Experience should either include: receiving and encoding preprocessing subsystems for coherent processing systems; or automatic self-test, systems interface requirements definition and automated computer controlled system testing.

R & D ELECTRONIC TECHNICIANS Must have 2 to 15 years background in microwave receiver systems, circuit design, breadboarding, or testing. Experience in RF, IF, video, digital techniques, or microcircuit electronics desired.

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ANTENNA TECHNICIANS Must have 2 to 10 years background in antenna system brassboarding and testing. Experience with modern amplitude and phase monitoring equipment is required.

SENIOR PACKAGING SPECIALISTS BSME, Senior Engineer with experience in advanced mechanical packaging techniques for airborne electronic subsystems including microwave, analog and digital circuits. Experience to include knowledge of applicable MIL-Specs, supervision of designers and draftsmen, packaging of microintegrated circuits and all producibility aspects of the design.

SENIOR MECHANICAL DESIGN ENGINEERS BSME with 5 or more years experience in the mechanical packaging design of electronic circuits. Experience to include the design of multi-layer printed wiring boards, dip brazing and castings.

MECHANICAL DESIGN ENGINEERS Requires 2 to 10 years experience in the mechanical design of printed circuitry, machined and sheet metal parts.

SENIOR PROGRAM ADMINISTRATORS BA, MBA or BS/MSEE with 2 to 10 years background in program administration or management. Duties require coordination and management of several programs relative to cost, schedule, and operations. Experience with modern cost, schedule, and control techniques is required. CSCS experience or equivalent desired.

PROJECT ADMINISTRATORS Business or Engineering degree with 2 to 10 years experience in cost, scheduling, and project control techniques desired.

While you'll find that your salary at the Garland Division is equal to or higher than that offered by other electronic firms, salary is only part of our Total Compensation Concept. Scheduled merit reviews/increases assure that your salary will grow with your responsibilities and achievements. You will be evaluated regularly. In addition, you'll earn a generous retirement and have the opportunity to participate in E-System's unique Employee Stock Ownership Plan (ESOP).

Each December the E-Systems Board of Directors determines the ESOP stock allocation to all E-System employees. Common stock is placed in a trust in your name. There's no cost to you.

We will help you continue your college-university level education. We also offer a formal in-house software training program to help broaden your skills while engaged in product development. We offer in-plant training seminars, television education programs from ten universities for credit and noncredit hours, and management development programs.

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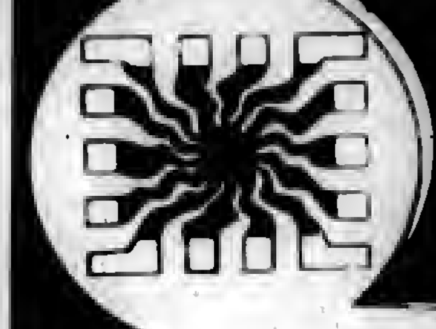
MICROPROCESSOR PROGRAMMERS/ ENGINEERS



New Hardware & Software programs create more new opportunities with Burroughs ... in San Diego

These openings are e clear indication of the continuing rapid expansion of our Micro-Components Group — located in Rancho Bernardo, a desireble suburban section of San Diego.

We're now looking for creative professionals who can make key contributions to the design and development of a new highly advanced LSI Micro-Processor System. All positions offer fully commensurate salaries, outstanding benefits, including relocetion assistence and the kind of long-range growth prospects you'd expect from a computer industry pacesetter like Burroughs. Openings are in the following areas:

LOGIC DESIGN

Will work on logic design of 1 or more of the LSI chips making up en advanced micro-computer system. Will interfece with softwere and IC designers. Requires 3 or more years experience in computer systems design and degree in EE or Computer Science.

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Will work with other programmers to develop high level language compiler. Requires BS degree in computer science or equivalent experience. Knowledge of PASCAL helpful.

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Will work with logic designers to insure that micro-computer components are testable. Will design and implement diagnostic programs. Requires experience in testing of computer systems with emphasis on LSI components. Degree in EE or Computer Science desirable.

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Will be responsible for coordinating and editing all documentation for micro-computer project, including both hardware end software user manuals. Requires experience in the preparation of documentation for Engineering or Programming projects. Degree in EE or Computer Science desirable.

Interested candidates should submit e resume, including salary requirements to Mr. R. Valenti, Professional Placement, Burroughs Corporation, 16701 West Bernardo Drive, San Diego, California 92127.

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Unparalleled growth and expansion of our Fortune 500 Corporation, an established world leader in the computer industry, has created challenging career opportunities for experienced software instructors. Individuals selected will provide support for our customer software training programs.

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Background should include experience in ASSEMBLER operations under a real time operating system preferably a PDP—11 operating under RSX-11.

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Qualified applicants are invited to send resume, in confidence, or call (COLLECT) to: Linda Linder, (312) 640-5567, Digital Equipment Corporation, 5600 Apollo Drive, Rolling Meadows, Illinois 60008. We are an equal opportunity employer m/f.

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A major southwest Los Angeles Company has a requirement for an individual with a strong background in systems analysis, specification and design.

Experience must include.

- Problem definition, feasibility analysis, and economic justification.
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The individual we are seeking will have a combination of technical, business, and interpersonal skills, coupled with maturity and sound judgment. These skills should encompass:

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- An indepth knowledge of the broad range of user disciplines found in an aerospace company
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- A sense of urgency in keeping current with data processing industry technological developments

If your experience and interest match these requirements, please send your resume, including salary histor to:

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PROGRAMMER/ANALYSTS

(OS, BAL or COBOL programming and design)

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positions require experienced FORTRAN programmers to develop on-line financial and property information systems. Extensive FORTRAN, data base and teleprocessing experience required. Prefer minicomputer and business data processing experience for this MODCOMP IV dual processor installation. Salary from $18,886. Send resume to Boise City Personnel, Box 500, Boise, Id. 83702. Equal Opportunity Employer M/F.

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Applicants must be thoroughly conversant with the 1100 Assembler, have a good general understanding of the Executive system, and be proficient in some higher level lenguages.

An excellent starting selary and benefits are offered. If qualified, please send your resumé to:

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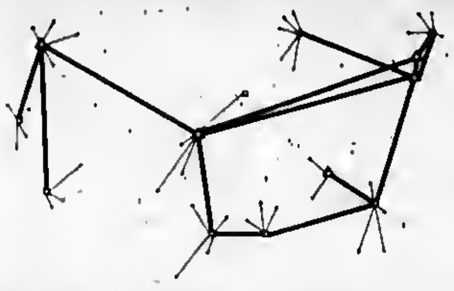

COMPUTER NETWORKS

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Computer networking has become one of the most dynamic sectors of the computer-communications industry. The NETWORKS ENGINEERING GROUP within the Communications-Electronics Center addresses all phases of distributed processing and computer communication networks. We are looking for individuals in the following areas:

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- Minicomputer Hardware/Software Design Tradeoffs
- Network Programmer/Analysts - PDP-11 (RSX-11D) H6000, Assembly language
- Message and Data Switching Systems Design

These entry through senior level positions require an Engineering or Science degree. Mixed BS, MS, and PhD's in Electrical Engineering and Computer Science preferred.

For prompt consideration, send resume and salary requirements to:

Lynn Hopewell
Director of Network Engineering

COMPUTER SCIENCES CORPORATION

Systems Division
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Your assignments will include:

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Data General

Computer Programmer

The City of Roswell is accepting applications for the position of Computer Programmer. Responsibilities include programming and system management for new installation. Any combination of experience and training equal to four years of responsible experience in computer programming. Experience in programming in BASIC for DEC PDP 11/34 on RSTS E desired. Send resume and salary requirements to Wilson Conover, Assistant City Manager, P.O. Box 1838, Roswell, New Mexico 88201.

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To teach data processing in area of information systems and to participate in curriculum development for information systems major. Doctoral degree preferred. Will consider a candidate near completion of degree. Will receive applications until January 11, 1978, for opening August 1978. Equal Opportunity Employer. Contact Dr. O.R. Sutton, College of Business, Appalachian State University, Boone, North Carolina 28608.

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Two positions are available. The first is for an individual with a degree in Computer Science, or equivalent experience, to perform applications and systems level programming. Should be familiar with PASCAL, ALGOL-68, PL-1, PL/M or similar high level structured programming languages. Some knowledge of RT.11, RSX11, runtime support packages and device handlers is required for this growth position.

We also seek an experienced applications programmer who has the ability to handle occasional assembler language problems. Must have 2-4 years mini-computer experience using FORTRAN, PASCAL, ALGOL, or ASSEMBLER language. Statistical analysis and data reduction experience is desirable, and experience with RT11 or RSX11 on PDP-11 or LSI-11 will be considered helpful.

Both programmers will be members of a project team employing a PDP-11/60 for development of an LSI-11 based distributed processing network. These openings require basic mathematical skills to the college algebra level. Prior experience in an educational environment would be an advantage in either of these career positions.

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As an integral part of a software development team, you will be responsible for internal and end user documentation, including training support materials and applications manuals. Will work with Marketing in presentation of new applications, customer training and in-service workshops.

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For an appointment, please send your resume along with salary requirements to: Whitney Moore, TIME SHARE CORPORATION, P.O. Box 6B3, Hanover, N.H. 03755.

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To assume responsibility for our proprietary data communications software and to participate in new product development. Experience with GA 16/65 and 440, time sharing operating systems and assembler language is desired.

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To participate in the implementation of proprietary hospital data management systems and the development of related new products. Experience in financial or commercial applications using ANS COBOL is required. Experience in hospital applications, on-line techniques and minicomputers would be a plus.

THE OPPORTUNITY

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Permanent position in desirable location.

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Space Research Corporation
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North Troy, Vermont 05859
Personnel Department
Equal Opportunity Employer

SYSTEMS PROGRAMMER

Mississippi State University Computing Center has a position on its systems programming staff for a highly motivated person with a minimum of a bachelor's degree and systems programming experience. UNIVAC 1100 experience highly desirable. Salary commensurate with experience. Excellent fringe benefits and opportunities for advancement.

Send resume to:
Dr. Wallace E. Killcreas
Div. of Numerical Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

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VM/370 Systems Programmer

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The successful applicant will have a minimum of 1 year system programming experience with VM/370 or CP-67 and a good understanding of IBM system 370 architecture. Candidates should hold a bachelor degree, preferably in Computer Science.

This position offers excellent growth opportunities, a competitive salary commensurate with experience and abilities, and excellent company paid benefits. Relocation assistance to Ottawa will be provided.

Please send a detailed resume, in strict confidence, quoting file number (47/77) to:

Mr. Ron G. MacMeekin
Staffing Specialist
Bell-Northern Research Ltd.
P.O. Box 3511, Station C
Ottawa, Ontario
K1Y 4H7

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• CICS COBOL or BAL	San Francisco
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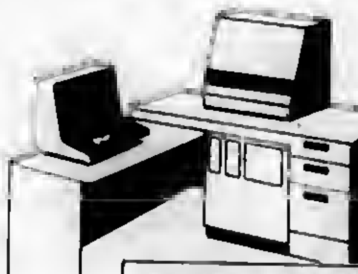

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Employment Department, CW-1128
Terminal Systems Division-Dayton
NCR Corporation
Dayton, Ohio 45479.

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DEC SYSTEMS PROGRAMMER

Southern California

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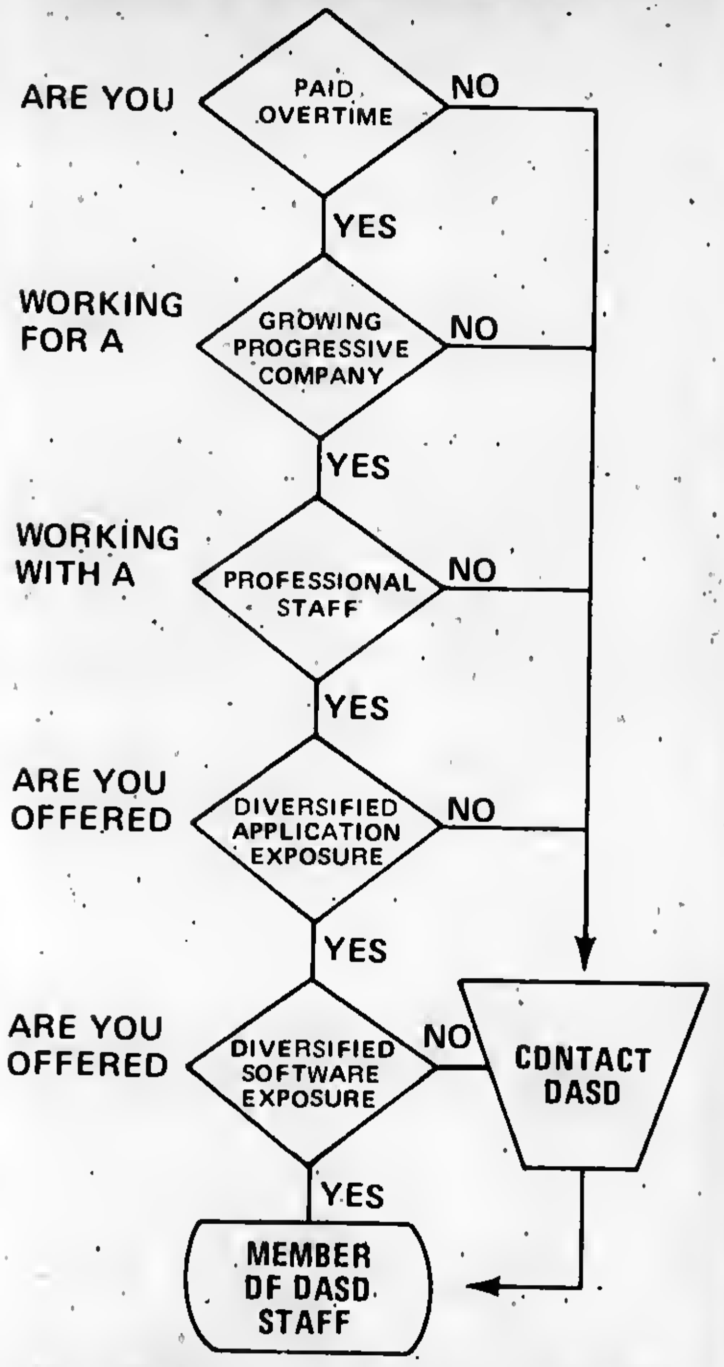
PROGRAMMERS PROGRAMMERS/ANALYSTS



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- Oakbrook, Illinois
- Tarzana, California

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This individual will be responsible for all Employee Relations activities within our Engineering organization. Heavy emphasis is being placed on Technical Recruiting. The ideal candidates for these positions should have 3-5 years experience as a Personnel Generalist or Professional Recruiter. Company industry exposure a definite plus.

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Send resumes to Jay Lyons

PRIME

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Our dynamic, growth-oriented comapny is seeking a responsible, intelligent individual for the above position. Qualified candidates should have a minimum of 5 years' Data Processing experience with a solid background in Systems Design and COBOL Programming, knowledge of data base and teleprocessing. Structured programming and experience with IBM 370 series DOS hardware is preferred.

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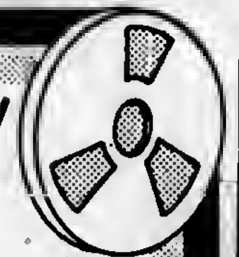
PROGRAMMER/ ANALYST



Challenging opportunity in our Research Programming Department to develop application systems in batch and on-line environments using DEC PDP-11/45 and IBM S/370. Application areas include support for biological scientists, statisticians, and laboratory automation. Mimimum of 2 years programming experience including application systems design and a degree in Math, Statistics, or Engineering preferred. Knowledge of BASIC or FORTRAN required, PL/1 or COBOL a plus.

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data processing

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Be responsible for daily axecution of jobs run at Computer Canter and for documenting/resolving system failure. Requires 2 years supervisory experiance combined with 2-3 years prior operations background in 370 OS/VS TP environment.

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SR. PROGRAMMER/ ANALYSTS

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PROGRAMMER ANALYST

Mainline Data Processing Services company offers opportunity to qualified Programmer/Analyst candidates - wide variety of applications and Hardware - State of the Art Software - professional environment - planned professional growth - competitive salary and benefits plan - positions available in our Baltimore, Buffalo, Chicago, Pittsburgh, Rochester and Syracuse locations. Call (412) 391-8962 or rush resume.

Computer Task Group, Inc.
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MANAGER DATA PROCESSING

Progressive multi-plant company located in growing upper midwest city needs an experienced data processing manager. Ideal candidate will have an under graduate degree, up to 5 years data processing management experience and growth potential. Salary in mid to upper $20's, attractive fringe benefit package. Send resume and current salary information to:

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Equal Opportunity Employer

Manufacturing Control Systems

Are you a Data Processing Professional tired of hearing talk about the need for "Management Commitment" to systems development?

Our corporate management IS committed to the long term development of computer supported systems. With their support we are developing effective people-oriented systems in a Data Base-Data Communication environment.

We are in the early phases of installation of an integrated manufacturing control system for the first of our eight manufacturing divisions. We recognize that our system will only be as good as the people who design and implement it.

We are seeking creative business-oriented individuals who have experience in Systems, Programming, and Project Management. We need "a few good people" to accomplish our goals.

Please submit a letter or resume including current salary in complete confidence.

WEHR CORPORATION

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10201 W. Lincoln Ave.
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If your career path is in Sales, this is a unique growth opportunity for aggressive, enthusiastic Data Processing or Communications professionals. We are a full line computer terminal company breaking away from the pack with an exciting new product. A sophisticated micro-processor based flexible disk controller with an untapped, wide open marketplace. Full management and technical support. The most advanced field service capability in the business..

Excellent compensation through salary and commission. To explore this sales opportunity, call Mr. Hansen, Toll Free

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or write to Personnel

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SYCOR

MANAGER USER LANGUAGES SOFTWARE DEVELOPMENT

Continued expansion in User Programming facilities for Sycor systems has created a management position in User Languages. This is a career position with high corporate visibility and requires an assertive individual who is capable of managing software professionals engaged in language development and compiler implementation.

The position requires a broad background in Software Engineering. Particular skills requirements include structured programming techniques; use of higher level languages for systems implementation; knowledge of one or more compilers; table-driven parsers; design of interpretative machines; microprocessor-based systems. Supervisory experience at the project team level or above is required. Advanced degree in Computer Science preferred.

We offer a competitive range of salaries, comprehensive benefits and highly-visible opportunities for future growth. To arrange an interview, send your resume to:

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Data Base Analyst

SALARY TO $1,793 MO

Include the design of IMS data bases; generation of DBD, PSB and MFS control blocks to support applications needs.

Equal to college grad and 4 yrs. exp. in systems analysis including 2 yrs. in designing IMS data bases and providing technical support in the development of IMS DB/DC systems.

Examination consists of interview which may be done by phone.

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Teaching position

open beginning in January, 1978 and/or September, 1978 in Computer and Information Processing. Qualifications: graduate degree (earned doctorate preferred) in computer field with experience in commercial/financial applications, or graduate degree (earned doctorate preferred) in business field with experience in computer applications. Teaching experien desired. Salary commensurate with experience and background ($13,000 to $26,000). Contact Dr. Norman L. Hilgar, Chairperson, Department of Business Administration, Bloomsburg State College, Bloomsburg, PA 17815 by January 16, 1978. Position is contingent on budgetary allocations and appropriations. An Affirmative Action, Equal Opportunity Employer.

SOFTWARE PROGRAMMER/ANALYSTS

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R E M R T S C C H S L L Y S R Y
O R C A M E A R C E G G A S C S
G A A W E V R E M D I P I R T S
R C R T T M E T S Y S R N E A S
A T O F S Y S R Y G E O T T M A
M I O O N L I E S R D G E R G S
M V R S A M B I E A T R R E I S
B E A L I V E V S M V A A I S E
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We're looking for PROGRAMMER/ANALYSTS to work on the world's largest and most advanced full text ONLINE SEARCH and RETRIEVAL SYSTEM.

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PROGRAMMER/ANALYST

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Our Programmer/Analyst - Educational Systems manages PDP/11 RSTS/E time-sharing system, plans and conducts programming courses in BASIC-PLUS and other languages, supervises student Programmer/Consultants and designs instructional and research software. Requires bachelor's degree, proficiency in one high-level and one assembler language, and experience in interactive instructional computing as programmer or programmer/analyst. Good benefits with salary based on qualifications. Submit resume, salary expectations, date available and names of three references to: Mr. R. Whitcomb, Personnel Director, P.O. Box 599, Appleton, Wisconsin 54911, by December 9. LAWRENCE UNIVERSITY, An equal opportunity employer.

FACULTY POSITION

at Northeastern University starting January 1, 1978. Assistant or Associate Professor. To teach computer languages and applications and assist in development of computer-science curriculum. Ph.D. in computer science preferred. Write: Prof. R. Poe, Dept. of Graphic Science, 360 Huntington Ave., Boston, MA 02115; or call: (617) 437-3634.

COMPUTER POSITIONS

Eastern Michigan University is accepting applications for the following positions:

Manager, Operation Services

Responsible for overseeing the efficient operation of computing equipment and facilities for all areas of the University. A Bachelor's degree in computer science or a related field or the equivalent combination of education and experience and one to three years experience in computer operations is necessary. A Master's degree and experience with IBM or DEC equipment are desirable.

Manager, Technical User Services

Will provide for the technical applications flexibility of current hardware, the installation of new equipment, and the communications and explanation of services to Users. A Bachelor's degree in computer science or related field or the equivalent combination of education and experience and three to five years as a software or hardware specialist are necessary. A Master's degree and experience in generating and maintaining an operating system are desirable.

Deadline: January 15, 1978. To request employment application, contact:

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112 CW Welch Hall
Ypsilanti, MI 48197
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data processing

Systems Analysts/ Programmers

Pacific Northwest

Immediate opening in Olympia, Washington for analysts/programmers with UNIVAC 1100 series computer experience; to design and code applications systems or operating systems/software for UNIVAC 1100 computer system including interactive teleprocessing using DMS - 1100 and TIP.

Requires bachelor degree in computer science or related field (or completion of two year vocational training course in data processing) and experience in one or more of the following: Systems Analysis, Design, Computer Programming, Software Programming, or Installation of Computer Applications Systems. Applicable experience can be substituted for education.

Salary, depending on qualifications, $13,500 to $24,000. Employer paid medical, dental, LTD, life insurance. Liberal holiday, vacation, sick leave policies.

Send resume indicating UNIVAC 1100 experience with salary history to:

CW Box 3336
797 Washington St.
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IMS PROGRAMMER

Large insurance company located in southeast has opening for a COBOL programmer. A minimum of one year's experience in on-line systems in an IMS data base environment is required. Experience with TSO and PANVALET would be helpful. Salary depending on experience. If you are interested, send resume to Personnel Department, Provident Life and Accident Insurance Company, Fountain Square, Chattanooga, Tennessee 37402.

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WANTED

Director of Systems and Programing. IBM System 370 OS/DOS ANS Cobol. Senior Programer with supervisory experience will be considered.

PROGRAMMER

IBM Model 370 DOS/VS experienced with Program Libraries. Call or mail Resume to:

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System Analyst

Two years experience developing COBOL systems and two years experience with FORTRAN preferably in higher education. Statistical application and experience at the college level. A knowledge of SPSS and BASIC is desirable.

Programmer

Knowledge of an ability to effectively apply various computer languages, emphasis on COBOL and FORTRAN. B.S. in Math, Statistics, or Computer Science; or A.S. in Computer Technology; or two years of programming experience in COBOL and FORTRAN. Knowledge of BASIC helpful.

Send resume to Wilson Rourk, Personnel Manager, Austin Peay State University, Clarksville, Tn. 37040.

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PROGRAMMER/ANALYST

We have immediate openings for two programmer/analysts with a minimom of two years experience in BAL or COBOL. Experience in CICS or DL1 coding desired but not required. Responsibilities include programming, testing, and implementing various batch and on-line applications.

Figi's is a medium size company located in Central Wisconsin. Most applications on our IBM 370/148 are order entry and mailing list oriented. This is an excellent opportunity with a profitable and progressive organization.

Send complete resume and salary requirements to:

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SOFTWARE PROGRAMMER/ANALYSTS

S	O	F	T	S	E	A	R	A	T	S	Y	L	A	N	A
E	I	N	O	T	Y	A	D	L	N	O	S	V	I	L	N
P	N	N	I	V	D	L	Y	S	G	A	T	B	M	N	A
P	T	S	E	A	R	C	H	T	I	V	L	E	T	O	L
R	E	M	R	T	S	C	C	H	S	L	L	Y	S	R	Y
O	R	C	A	M	E	A	R	C	E	G	G	A	S	C	S
G	A	A	W	E	V	R	E	M	D	I	P	I	R	T	S
R	C	R	T	T	M	E	T	S	Y	S	R	N	E	A	S
A	T	O	F	S	Y	S	R	Y	G	E	O	T	T	M	A
M	I	O	O	N	L	I	E	S	R	D	G	E	R	G	S
M	V	R	S	A	M	B	I	E	A	T	R	R	E	I	S
B	E	A	L	I	V	E	V	S	M	V	A	A	I	S	E
R	V	N	G	E	T	O	A	S	S	E	M	B	L	E	R
I	V	B	I	B	N	I	L	N	O	I	B	L	V	D	M

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data processing

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PROGRAMMER

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P. O. Box 10628
Charlotte, N.C. 28237
1-704/377-6555

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Greg O'Reilly, Figi's Data Center, Inc., Central Plaza, Marshfield, Wis. 54449.

ASSISTANT DIRECTOR ADMINISTRATIVE DATA PROCESSING

The Administrative Data Processing Department is extremely productive in serving the current data processing needs of the University in such areas as Accounting and Finance, Admissions, Registration, Financial Assistance, Housing, Personnel, Alumni and Development, and Budget. Additionally, comprehensive new systems development projects for the Student and Employment areas are well underway.

The individual to be selected will assist the Director in the planning, implementation, and management of: current systems maintenance; data control, data entry and computer operations; new systems development; hardware, software and personnel resources; and related budgets.

Accordingly, the ideal candidate will have had a minimum of 12 years of data processing experience, including line management responsibilities for systems maintenance, operation and systems development activities, preferably in a heavy user-oriented environment.

Please forward resume in complete confidence by December 16, 1977, to: Peter Capodilupo, Director, Administrative Data Processing.

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If you have:

- Three years' experience as a project leader, minimum
- Successful completion of at least one six-man year project, supervising 4 or more persons
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and desire a challenging career in a stimulating environment, please forward detailed resume, including salary history and requirements, in confidence, to:

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DATA PROCESSING MANAGER

We are a worldwide leader in the marine engineering and construction industry offering a challenging managerial position in Dubai United Arab Emirates.

Bachelor degree preferably in accounting or computer science and 6 years experience with project management responsibility in a variety of application area including accounting and finance.

Should be familiar with DOS/VS operating system in an on-line environment; IE 4 135/138, teleprocessing and Cobol.

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MUST come from BANKING environ. 370/COBOL.
BUCKS CNTY To $17K
MFGR-MINI w/BASIC nec.

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Philadelphia, PA 19102
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Manager needed for new electronic graphic art department in a large publishing and printing company. Degree in computer science with some graphic art knowledge is a plus. Responsibility will involve all phases from input of text and graphics to output from CRT typesetter. Full company paid benefits. Send resume and salary requirements to Personnel Department, P.O. Box 1103, Louisville, KY 40201. An Equal Opportunity Employer.

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- Software support position to assist systems programming in on line assembler, teleprocessing applications: software for maintenance and batch processing for on line files. Excellent growth opportunity for one with strong ALC to develop in the systems area.
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- Programming positions for Cobol professionals with 2-4 years experience.

Computer resource is an IBM 360/50, DOS, central processing unit.

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Los Angeles County's Data Processing Department has career opportunities for programmers experienced in major EDP applications. Experience in the development and maintenance of financial, election, assessment, welfare, justice, health care and engineering applications in an IBM 370/TSO/RJE/IMS, Univac 1100/TIP/DMS, COBOL environment is particularly desirable.

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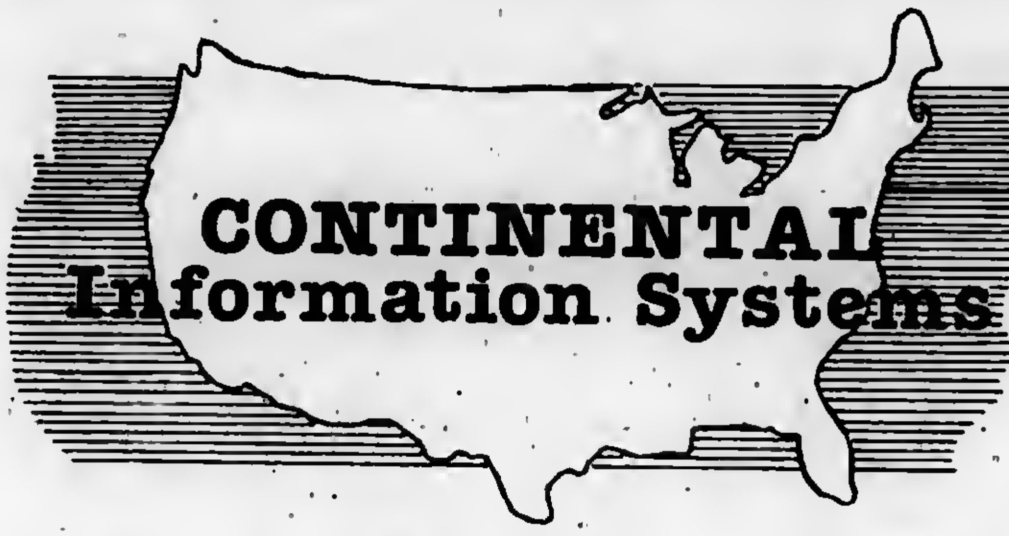

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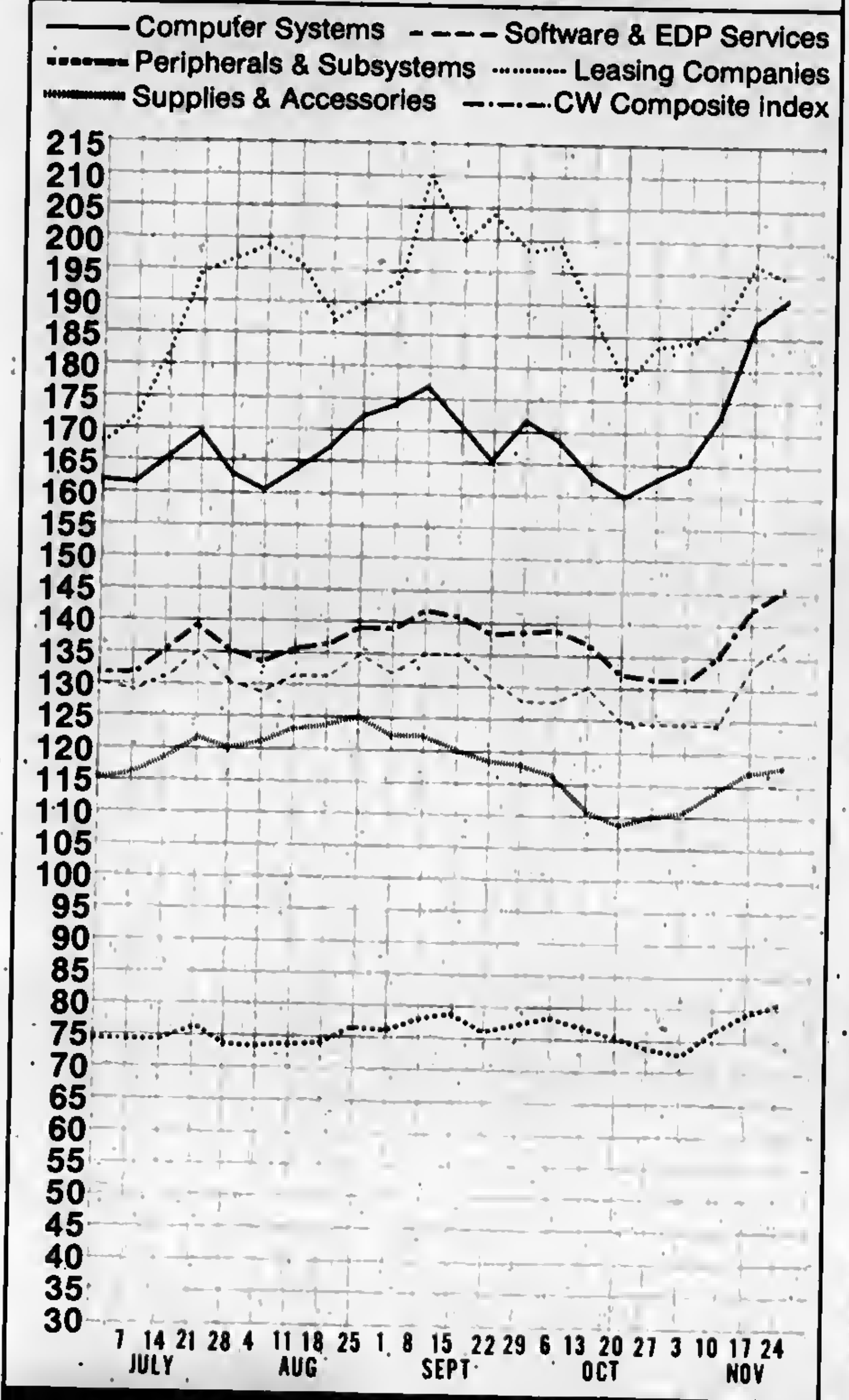

Earnings Reports

COMPUSERV
Three Months Ended Sept. 6

	1977	1976
Shr Ernd	$.18	$.26
Revenue	3,095,000	2,829,000
Earnings	196,00	301,000
9 Mo Shr	.74	.70
Revenue	6,792,000	7,466,000
Earnings	637,000	741,000

MCI Communications
Three Months Ended Sept. 30

	1977	a1976
Shr Ernd	$.05	.....
Revenue	17,936,000	$15,616,000
Tax Cred	541,000	.....
Earnings	1,004,000	(251,000)
6 Mo Shr	.06	.....
Revenue	35,609,000	26,664,000
Tax Cred	649,000	.....
Spec Cred	.....	2,015,000
Earnings	1,660,000	(1,532,000)

a-Restated.

MSI DATA
Three Months Ended Sept.30

	1977	1976
Shr Ernd	$.45	$.34
Revenue	9,257,447	6,377,054
Earnings	904,613	672,299
6 Mo Shr	.95	.86
Revenue	16,315,166	17,020,232
Earnings	1,703,027	1,266,643

MODULAR COMPUTER SYSTEMS
Three Months Ended Sept. 30

	1977	a1976
Shr Ernd	$.31	.....
Revenue	13,866,000	$6,714,000
Disc Op	144,000	(246,000)
Earnings	1,066,000	(666,000)
6 Mo Shr	.60	.....
Revenue	39,729,000	26,513,000
Disc Op Loss	26,000	566,000
Earnings	1,621,000	(4,976,000)

a-Restated.

NASHUA
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.60	$.45
Revenue	102,566,000	91,589,000
Earnings	3,700,000	2,070,000
6 Mo Shr	2.30	1.30
Revenue	300,796,000	266,150,000
Earnings	10,650,00	6,020,000

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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	43 3/4	+1 1/2	+3.5
N	BURROUGHS CORP	55- 91	70 7/8	+2	+2.9
O	COMPUTER AUTOMATION	18- 30	27	+ 5/8	+2.3
N	CONTROL DATA CORP	20- 27	26 3/4	+1 3/4	+7.0
O	CRAY RESEARCH INC	15- 29	25 1/2	+ 1/2	+2.0
N	DATA GENERAL CORP	35- 52	52	+ 1/4	+0.4
N	DATAPOINT CORP	18- 40	40	+3 3/8	+9.2
N	DIGITAL EQUIPMENT	37- 53	49 1/2	+1 1/2	+3.1
N	ELECTRONIC ASSOC.	2- 3	2 3/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 12	11 1/4	- 3/8	-3.2
O	FOUR-PHASE SYSTEMS	13- 20	20	+ 5/8	+3.2
N	FOXBORO	41- 54	44 5/8	+ 7/8	+2.0
O	GENERAL AUTOMATION	6- 9	6 3/4	- 1/4	-3.5
O	GRI COMPUTER CORP	1- 1	3/4	0	0.0
N	HEWLETT-PACKARD CO	69- 87	76 3/8	+ 7/8	+1.1
N	HONEYWELL INC	43- 55	49 1/4	- 1/2	-1.0
N	IBM	245-286	266 1/4	+8 3/8	+3.2
O	MANAGEMENT ASSIST	5- 9	8 7/8	+ 1/4	+2.8
O	MICRODATA CORP	7- 18	11 1/2	0	0.0
O	MODULAR COMPUTER SYS	5- 9	9 3/8	+ 1/4	+2.7
N	NCR	32- 47	42 7/8	- 3/4	-1.7
O	PRIME COMPUTER INC	12- 23	21 1/2	+ 5/8	+2.9
N	PERKIN-ELMER	17- 22	20 1/2	+ 1/4	+1.2
N	RAYTHEON CO	16- 35	34 3/4	+1 7/8	+5.7
N	SPERRY RAND	30- 42	34 3/4	- 1/8	-0.3
O	SYCOR INC	8- 15	14 3/8	- 5/8	-4.1
A	SYSTEMS ENG. LABS	5- 9	8 7/8	+ 1/2	+5.9
A	WANG LABS.	10- 14	13 3/4	+1 1/8	+8.9

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	0	0.0
O	BOOTHE COURIER CORP	8- 10	12 1/2	+ 7/8	+7.5
O	COMDISCO INC	10- 14	12 3/4	- 3/4	-5.5
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	-	-6.2
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 3	2 1/2	+ 3/8	+17.6
N	DPF INC	6- 9	9	- 1/8	-1.3
N	ITEL	13- 22	20 1/2	+ 1/2	+2.5
N	LEASCO CORP	19- 27	24 3/4	- 5/8	-2.4
O	LEASPAC CORP	1- 2	3/4	- 1/4	-25.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 15	15 1/8	+ 1/8	+0.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	3/4	0	0.0
O	ANACOMP INC	7- 10	8 5/8	- 1/8	-1.4
A	APPLIED DATA RES.	5- 10	8 7/8	+ 3/8	+4.8
N	AUTOMATIC DATA PROC	23- 30	28 3/8	- 1/8	-0.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	12 3/4	+ 1/2	+4.0
O	COMP ELECTRON SYSTMS	6- 10	9 1/8	- 3/8	-3.9
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 7/8	- 1/8	-1.2
N	COMPUTER SCIENCES	7- 9	8 7/8	+ 5/8	+7.5
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 7/8	+ 1/4	+15.3
O	COMSHARE	5- 8	8	+ 1/2	+6.6
O	DATA DIMENSIONS INC	3- 5	3 3/4	- 1/8	-3.2
O	DATATAB	1- 2	1 1/4	+ 1/8	+11.1
N	ELECTRONIC DATA SYS.	14- 20	15 1/2	- 5/8	-3.8
O	INSYTE CORP	2- 3	1 3/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	+ 1/4	+12.5
O	KEANE ASSOCIATES	3- 4	4	+ 1/8	+3.2
O	KEYDATA CORP	1- 3	1 3/8	0	0.0
A	LOGICON	7- 17	14 3/4	+1	+7.2
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 15	15 3/8	+ 1/2	+3.3
O	NATIONAL DATA CORP	4- 7	7	+ 1/8	+1.8
A	ON LINE SYSTEMS INC	16- 22	19 7/8	+1 1/8	+6.0
N	PLANNING RESEARCH	3- 6	4 1/2	+ 1/4	+5.8
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	3 1/8	+ 5/8	+25.0
O	REYNOLDS & REYNOLDS	17- 20	19 1/2	+ 3/4	+4.0
O	SCIENTIFIC COMPUTERS	1- 4	3 3/4	- 1/4	-6.2
O	TYMSHARE INC	14- 23	21 7/8	-1	-4.3
A	UPS SYSTEMS	4- 5	5	+ 3/8	+8.1
N	WYLY CORP	1- 2	3/4	-	-7.7

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	15	+ 1/4	+1.6
O	ADVANCED MEMORY SYS	7- 9	8 1/2	+ 1/2	+6.2
N	AMPEX CORP	8- 11	9 3/4	0	0.0
O	ANDERSON JACOBSON	3- 5	4 3/4	+ 1/8	+2.7
N	APPLIED DIG DATA SYS	10- 20	13 7/8	- 1/4	-1.7
O	BEEHIVE INT'L	5- 12	5 3/4	- 3/4	-11.5
A	BOLT, BERANEK & NEW	7- 9	7 3/4	+ 1/4	+3.3
N	BUNKER-RAMO	8- 13	12 3/4	+ 7/8	+7.3
A	CALCOMP	3- 5	2 3/4	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3	+ 1/8	+6.6
N	CENTRONICS DATA COMP	20- 30	22 1/4	+ 5/8	+2.8
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	5- 8	6 3/4	+ 1/4	+3.8
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2 7/8	- 1/4	-8.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
E	COMTEN	9- 13	10 3/4	+ 3/8	+3.6
N	CONRAC CORP	19- 28	22 1/4	+ 3/8	+1.7
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 10	9 1/8	+ 1/4	+2.8
A	DATA PRODUCTS CORP	9- 17	17 3/8	+ 1/4	+1.4
O	DATA TECHNOLOGY	3- 4	4	- 1/4	-5.8
O	DATUM INC	1- 2	2	0	0.0
O	DECISION DATA COMPUT	2- 3	2 1/8	+ 1/8	+6.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	9	0	0.0
O	DATARAM CORP	2- 15	15 1/4	+4 1/4	+38.6
N	ELECTRONIC M & M	4- 5	4	0	0.0
O	FABRI-TEK	1- 2	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	0- 2	1 3/8	+ 1/4	+22.2
N	HAZELTINE CORP	8- 12	10 3/8	0	0.0
N	HARRIS CORP	28- 44	41	- 3/4	-1.7
A	INCOTERM CORP	10- 19	18 5/8	- 1/4	-1.3
O	INFOREX INC	4- 7	6 1/8	+ 7/8	+16.6
O	INFORMATION INTL INC	9- 14	9 3/4	+ 1/2	+5.4
O	INTEL CORP	38- 57	46	0	0.0
A	LUNDY ELECTRONICS	3- 6	3 7/8	0	0.0
O	MSI DATA CORP	6- 13	13 1/4	- 1/8	-0.9
O	MEMOREX	23- 34	30 3/4	+1	+3.3
N	MOHAWK DATA SCI	5- 8	6	+ 1/8	+2.1
O	PENRIL CORP	2- 5	5 3/8	+ 1/4	+4.8
N	PERTEC CORP	7- 10	9 3/4	+ 3/8	+4.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	3- 5	3 1/8	0	0.0
O	RECOGNITION EQUIP	6- 10	7 3/4	- 3/8	-4.9
O	SCAN DATA	1- 2	7/8	+	+7.1
O	STORAGE TECHNOLOGY	10- 20	20	+1 3/4	+9.5
O	T BAR INC	7- 13	13 3/4	+ 3/4	+5.9
O	TALLY CORP.	4- 6	4 1/8	- 1/8	-2.9
A	TEC INC	7- 10	7 1/4	- 1/8	-1.6
N	TEKTRONIX INC	29- 40	39 1/4	- 1/2	-1.2
N	TELEX	2- 3	2 1/2	- 1/8	-4.7
O	WILTEK INC	1- 1	1/2	- 1/4	-20.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 3/4	- 1/8	-1.8
O	BALTIMORE BUS FORMS	1- 4	1 1/8	0	0.0
A	BARRY WRIGHT	10- 15	14 3/4	+1 1/4	+8.2
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DIPLEX PRODUCTS INC	14- 19	17 1/4	+1 3/4	+7.6
N	ENNIS BUS. FORMS	6- 7	6	+ 1/8	+2.1
O	GRAHAM MAGNETICS	11- 18	17 1/2	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	15 1/4	+ 1/4	+1.6
N	3M COMPANY	46- 56	49 1/4	- 3/8	-0.7
O	MOORE CORP LTD	24- 37	26	0	0.0
N	NASHUA CORP	16- 23	20 1/4	+1	+5.1
O	STANDARD REGISTER	19- 25	23	+ 1/2	+2.2
O	TAB PRODUCTS CO	13- 19	19 3/4	0	0.0
N	UARCO	18- 22	21 1/4	- 3/4	-3.5
A	WABASH MAGNETICS	10- 15	13 1/4	- 3/4	-5.3
N	WALLACE BUS FORMS	17- 21	19 1/2	0	0.0

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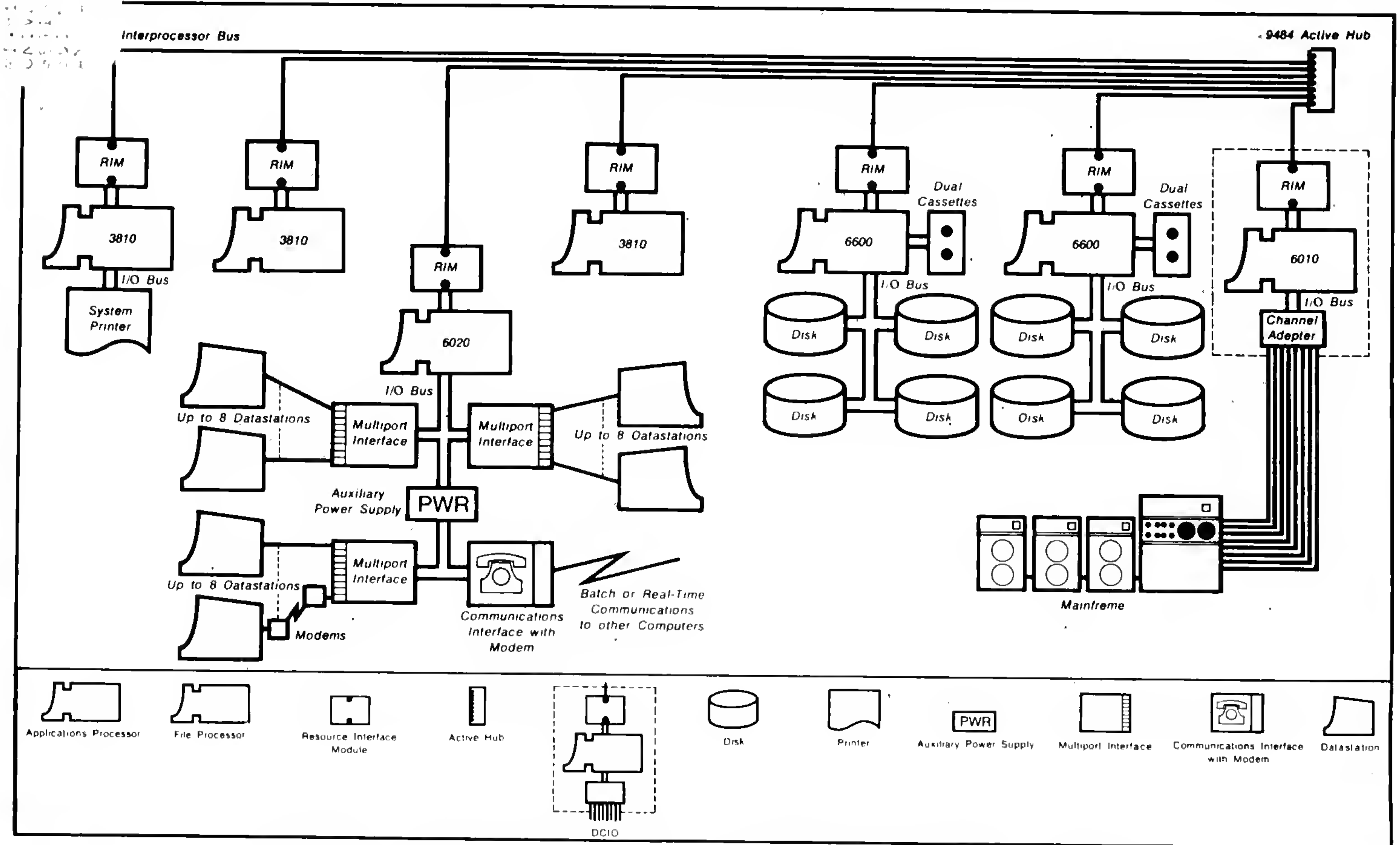
:apoint Concept Links Dedicated Processors



One configuration of the ARC system includes an interface to an IBM 360/370 mainframe.

By Esther Surden
CW Staff

NEW YORK — Datapoint Corp. last week unveiled a concept that reportedly permits users to configure several functionally dedicated processors along a common bus so all processors act as a single system and have access to a common data base.

The Attached Resource Computer (ARC) system concept links the functional processors to a coaxial bus with certain processors dedicated to file and data base maintenance while others serve as application processors.

Datapoint calls the concept "attached processing."

Users with Datapoint equipment already in place can implement an ARC system by adding specialized software as well as an interprocessor bus of high-speed coaxial cable, Resource Interface Modules (RIMs) and Active or Passive Hubs to link the RIMs, a spokesman explained.

Three System Elements

An ARC system includes three basic elements: processors dedicated to applications, processors dedicated to handling files and the interprocessor coaxial bus, which transfers data at a rate of 2.5 million bit/sec.

The applications processors run user-defined applications, either in batch or transaction processing mode. An applications processor may have either a single user or multiple users, depending on the processor chosen.

Any of the processors in the Datapoint line can be used as applications processors, as can IBM mainframes, the spokesman noted. However, IBM CPUs can be hooked into the system only through use of a Direct Channel Interface Option (DCIO).

The DCIO attaches to the byte multiplexer channel on IBM 360/370 equipment and the mainframe can run jobs in Basic, Cobol, RPG, Fortran, PL/I and other languages and access the system's common data base.

Program results from the IBM system are then stored in the ARC data base for use by other applications processors on the system, Datapoint said, adding the entire ARC system would look like extremely fast unit record equipment to the IBM computers.

Datapoint 6600/5500 minicomputers can be used as the file processors in the system, and they manage the mass

(Continued on Page 6)

Federal Laws Forcing Rise In Employee Record Costs

By Ann Dooley
CW Staff

MONTVALE, N.J. — Automated personnel recordkeeping — exclusive of payroll files — is costing the nation's businesses an estimated $75 per employee or $1.3 billion per year, according to a report released here recently by Information Sciences, Inc. (InSci).

These personnel recordkeeping expenses, which now represent a median of 5% of corporate DP budgets, are largely the result of increasing government regulations and will increase further as companies continue to upgrade to on-line, data base management and remote-batch terminal systems, the report said.

The survey results were drawn from more than 600 human resource and corporate executives from 300 major U.S. companies at a recent human resource systems conference sponsored by InSci.

More than 38% of the survey respondents estimated that the size and cost of their organizations' recordkeeping functions had doubled as a result of compliance with federal regulations and nearly 57% answered that their costs had at least tripled.

(Continued on Page 5)

NCR Caps 8000 With Two CPUs, Its Biggest Yet

By Jeffry Beeler
CW Staff

DAYTON, Ohio — NCR Corp. last week rounded out its 8000 processor series with the announcement of what the company said are the two most powerful computer systems it has yet introduced.

The Model V-8580 provides 33% more processing power than the V-8570, formerly the largest member of the 8000 line, and 20% more performance than IBM's 370/148, the NCR system's main competitor, the firm

(Continued on Page 4)

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Internal IBM Memo Points to Katzenbach As Director of Document Laundering Plan

By Catherine Arnst
CW Staff

NEW YORK — IBM's general counsel — a former U.S. Attorney General — apparently directed a company project in which top officials "laundered" the language used in company documents to avoid references to actions that might violate antitrust laws.

According to recently released documents in the U.S. vs. IBM antitrust case here, Nicholas deB. Katzenbach, Attorney General in the Johnson Administration, instructed top corporate officials of the Management Review Committee (MRC) on "terms to be avoided and terms to be used to maintain consistency" at a Saturday meeting of the group on May 31, 1969, just four months after the government filed suit against the firm.

The document — one of several thousand IBM has been fighting to keep out of the public record in the case — deals specifically with IBM's planned unbundling announcement, which followed the MRC meeting by a month.

For example, the officials at the meeting were instructed to answer "why unbundle?" questions by emphasizing that the decision was made "before filing of suits," but that IBM "moved up its timetable and broadened its action in response to [the Department of Justice] filing."

The executives were also instructed to answer that the firm "continues to believe its pricing practices were legally correct; that the [government] position and that of other claimants is somewhat premature as it relates to separate pricing," according to charts prepared for presentation at the session.

That MRC document — written by Hilary Faw, assistant treasurer for the firm — was also used by the government to lay foundation for an undated and unsigned document that it entered into evidence in June of last year.

The one-page memo — entitled "Bullen Task Force," which was the IBM task force set up to study unbundling approaches — also warned executives to watch their language.

"There are several legal defenses which could be adversely affected if executives are not careful in choosing the right words when publicly discussing" the unbundling issue, that document said.

"We should not admit any legal liability to our users to supply support services to them without charge," the document continued. To avoid such admissions, words like "commitment to our customers," "obligation" and "liability" were to be avoided.

"Instead, we should use the phrase, 'During the transition period, customers will receive systems engineer assistance without charge to the extent such services had been mutually planned by IBM and the user,' " the memo said.

The memo acknowledged that there are some arguments that can be made that our traditional way of providing programs services without charge was not an illegal tie" and that words "which appear to admit a tie should be avoided." Such words were "tie," "bundle," "unbundle," "separate price" and "formerly offered for a single price."

"Instead we should say 'services previously furnished without charge will now be offered for a charge.' "

The firm should also avoid the phrase "programs available to users of IBM CPUs" because it was inconsistent with IBM's defense that IBM computer programs belong to the public domain, the document said.

IBM defense attorney Ronald Rolfe objected to the government's attempt to tie these two documents together, claiming there was no foundation for such a connection.

Correction

In "HIS Restructures Level 68 Line" [CW, Nov. 21], it was incorrectly stated that Gcos software is provided with the hardware. Instead, Multics software is provided and all other software is separately priced. In addition, the Model 68/80 cannot be field upgraded to the 68/DPS system.

Price Hikes Hit Xerox Users

WALTHAM, Mass. — Honeywell Information Systems, Inc. has hiked prices across the board for systems and services provided for its Xerox computer system user base.

Price increases were effective Dec. 1 for "new" business and will take effect March 1 for existing contracts.

Purchase prices for selected Xerox computer systems will be raised 10%; lease charges for most Xerox computer systems will be increased 2.5%. Xerox computer maintenance and field expansion charges will be hiked 5% to 7%, HIS said.

Purchase prices will be boosted 10% on Sigma 9 and 9/3 computer systems.

The 2.5% jump in monthly lease rates affects all Xerox Sigma 2, 3, 5, 6, 6E, 7, 8, 9, 9/2 and 9/3 CPUs, features and options; all Xerox 530, 550 and 560 CPUs, features and options; all 9 series XDS 925, 930, 9300 and 940 CPUs, features and options; all Xerox peripherals and options; and all systems analog instruments and computer systems products, according to a spokesman.

Monthly maintenance and field expansion charges will increase by 5% for all Sigma 5, 6, 6E, 7, 8, 9, 9/2 and 9/3 CPUs, features and options and for all Xerox 550 and 560 CPUs, features and options.

Monthly maintenance and field expansion charges will increase by 7% for all Sigma 2 and 3 CPUs, features and options; all Xerox 530 CPUs, features and options; all 9 series XDS 925, 930, 9300 and 940 CPUs, features and options; all Xerox peripherals and options; and for all systems analog instruments and computer systems products.

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11:59:59

Before the ball drops on 1977, our thanks to 1,614 users for giving SyncSort 50% of its market!

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Why start 1978 with a sorting hangover?

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SCENE: One of those prestigious industry seminars that took place just a few years ago. The very cream of the data-processing world was in attendance. All the women were brilliant and all the men were handsome.

During a pause for refreshment, an affable hardware executive stopped to exchange a few words with Our Man on the Scene.

"SyncSort?" he said. "Sorting program, isn't it? Well, lots of luck. But you'll have to remember that sorting has traditionally been the hardware manufacturer's turf."

Our man didn't say a word. He just favored the hardware merchant with a cheshire-cat smile and thought to himself: Wait, friend, wait!

* * *

We're happy to announce that the wait is now over. On December 1, the sorting turf changed hands. SyncSort became the most widely used OS and OS/VS sort in the U.S., with 1,614 tough-minded, clear-eyed users — or half the total. (To whom, incidentally, we send our warmest holiday greetings!)

The tables below will give you a somewhat clearer picture of IBM's Decline and Fall as a Sorting Power. The figures on the left show the results of a telephone survey of OS and OS/VS users in America conducted for us last July by the International Data Corporation. (We'll be glad to send you a copy if you'll call.)

The figures on the right are an updated projection to December 1, made by our beloved House Statistician, a fussy old character in a green eye shade, formerly employed by Scrooge & Marley.

OS & OS/VS Sort Users — U.S. Only

	July 1, 1977		December 1, 1977	
	#	%	#	%
SyncSort	1333	43	1614	50
5740-SM1	992	32	880	28
5734-SM1	465	15	395	12
SM023	186	6	182	6
Others	124	4	129	4
	3100		3200	

As the math majors among you will have concluded, IBM's three sorts — one of which is a "freebie" — now have only 46% of a market that once belonged to them lock, stock and barrel. A very bad case of erosion, as our dentist would say.

And as for the other sorts, well, they're still holding on to their share of the market with what's left of the old fingernails.

There are probably a number of reasons for SyncSort's accelerating success in 1977. But if you had to isolate the three most important, you'd have to say performance, performance and performance. If a sort program doesn't save your computer resources and make your life a little more pleasant, what does it do? Boil eggs?

WHITLOW COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Defunct Supermarket Sues Univac for Fraud

By Molly Upton
CW Staff

SAN FRANCISCO — Does use of a computer system constitute user acceptance? That's a large issue in the $825,000 suit alleging fraud that has been brought against Univac by Store to Door Supermarkets, Inc. and is scheduled for trial Feb. 27.

Store-to-Door (STD) was in business less than three months and, within four days of opening in 1972, was forced to switch to next-day delivery of groceries instead of same-day service because of problems in connection with the Univac 9400 computer system, the complaint alleged.

At a recent hearing in federal district court here, Judge William H. Orrick Jr. left standing the substance of STD's charges of fraud and misrepresentation after striking some of the counts, according to STD attorney Charles D. Chalmers of Weld, Freeland and Chalmers.

STD voluntarily withdrew its claims for implied warranty, Chalmers said.

Univac declined to comment on the case.

The suit seeks $825,000 in losses as well as interest and penalty. It is not a straight contracts case, but charges Univac with fraud and misrepresentation in several counts such as its statements that the 9400 was a proven and reliable computer and that Univac would assign experienced personnel to create software for STD.

The STD suit charges that "programmers at Univac on the STD project received training in Cobol, used on the STD system, while working on the project.

In addition, "no one at Univac on the STD project team had ever worked on a 9400 real-time communications system before," SDC charged.

STD was founded on the premise that it could offer consumers delivery of groceries on the same day they called in the order.

As the opening date drew near, Univac had not completed system pretesting, according to the complaint. Because the firm wanted to open on Sept. 7, the Univac project leader told the firm to begin operations with the computer, saying it would function properly STD said.

Univac told STD it would complete its acceptance testing later, the complaint stated.

However, by Nov. 4, when the firm closed, Univac had not demonstrated the system satisfactorily, STD stated.

STD also charges that Univac's failure to notify the firm of problems that were likely to result in delays was fraudulent and oppressive.

Univac, in its brief, pointed out that an amendment to the software contract included a "use constitutes acceptance" provision.

"If Store-to-Door desires to utilize the computer system and software for commercial and/or retail operations before formal acceptance is complete, Store-to-Door agrees that the computer system and software are accepted," the contract stated.

"Univac Phase 1 liabilities will be satisfied when order-taking operations utilizing the computer system commence."

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Two CPUs Top Off NCR 8000 Line

(Continued from Page 1)

claimed.

The Model V-8590, meanwhile, offers twice the processing power of the V-8570 and performance comparable to that of its principal rival, the IBM 3031, NCR said.

The debut of the two latest additions to the 8000 family, which this year has grown from two to 15 models, coincided with NCR's introduction of an increased-capacity disk unit and a magnetic tape drive.

In announcing the two top-of-the-line computer systems, NCR predicted that next year it would introduce a still larger CPU family dubbed the V-8600, a "large-scale multiprocessor" line the company said would mark its "first offerings in the very large systems field."

Quoting his firm's technical experts, NCR's new services manager, Bob Skovgard, attributed the two computer systems' increased processing power to modified processor and memory designs. Improved processor features include a "hardware assist unit" that executes in hardware commands that otherwise would be executed in firmware, Skovgard said.

With the V-8570 and other members of the 8000 lines, execution of a command involves two firmware calculations or subroutines — one to locate the needed address and the other to access the address. In the hardware assist unit, however, index registers replace the firmware subroutines, he explained.

The unit thus circumvents the locating and accessing steps and speeds processing, he said.

Both the V-8580 and V-8590 incorporate a hardware assist unit. The V-8590 also comes with dual processor — a fact that explains why the V-8590's computing power exceeds the V-8580's, Skovgard said.

Both of theV-8590's processors share all system resources, the company added.

Memory enhancements incorporated in the two systems include the use of both 16K-bit technology and four-way interleaving, a design technique that "allows several processing subsystems to access memory at the same time," NCR stated.

The V-8580 and V-8590 mark the first application of these two memory features in NCR's product designs, Skovgard said. All earlier members of the 8000 family had incorporated 4K-bit technology and two-way interleaving.

Typical Applications

The processor and memory enhancements enable the V-8580 and V-8590 to perform jobs that would have outstripped the processing power of NCR's previous systems, the firm said. Typical applications for the two systems include standard business functions like general ledger and accounts receivable, Skovgard stated.

Both systems operate under NCR's Virtual Resource Executive and come with an "extensive" library of application programs for manufacturers, financial institutions, retail firms, wholesale distributors, educational institutions, government offices and health-care organizations. The two systems accommodate programs written in Cobol 74, Neat VS, Fortran, RPG, Cobol 68, Neat/3 and NCR Century languages, according to the firm.

Users of earlier 8500 series processors can upgrade to a V-8580 by attaching a hardware assist unit, replacing their power supplies, installing a faster and denser instruction storage memory board, replacing their 64K memory boards with 256K memory boards, adding a second memory plenum, obtaining an added memory interface and attaching extra card slots, Skovgard said.

Both computer systems access memory in 475 nsec, operate with a processor cycle time of 56 nsec and provide up to eight trunks, NCR spokesmen noted.

In addition to its other features, the V-8590 offers a modified input/output method in which an I/O link protocol transfers data serially at 2 million byte/sec, the firm added. In some instances this improved I/O method yields cost savings of up to 50%, Skovgard claimed.

To implement the I/O technique, NCR has equipped the V-8590 with up to six I/O link controllers, each of which attaches to the processor's internal transfer bus and accommodates up to four I/O links, the company said.

Peripheral Additions

NCR's latest peripheral additions, the 6540 disk storage subsystem and the 6370 magnetic tape storage unit, also use the I/O link protocol, as do the firm's earlier peripherals like the Model 658 disk unit and the Model 647 printer line, according to the spokesmen.

The 6540 subsystem transfers data at 1.2 million byte/sec, accesses in 38.3 msec and, with a capacity of 540M bytes, stores about three times more data than what was previously NCR's largest disk unit, Skovgard said. Each of the subsystem's four nonremovable disks provides five recording surfaces for a total of 20, he added.

The 6370, meanwhile, uses the Group Coded Recording mode to store 6,250 bit/in. and transfer data at up to 1.2 million byte/sec, NCR said.

Deliveries of the disk storage subsystem and the magnetic tape unit will begin in the latter half of next year, as will the first shipments of the V-8590. Deliveries of the V-8580 are scheduled to start in the third quarter of 1978.

Purchase prices for the 6370 tape unit begin at $24,100, with monthly rentals starting at $640. Prices for the 6540 disk subsystem are not yet available, Skovgard said.

A V-8580 processor with a minimum 1M-byte memory and three I/O trunks costs $517,600 or leases for $11,385/mo under a five-year contract. It expands to 4M bytes in 1M-byte increments that sell for $110,000 or rent for $3,303/mo under a five-year contract.

A V-8590 with a minimum 2M-byte memory costs $720,000 or leases for $18,810/mo under a five-year contract, and it expands in 1M-byte increments to as much as 6M bytes, according to the company.

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High Court Kills Bell Bid For Antitrust Immunity

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — AT&T's bid for immunity from antitrust prosecution because of its regulated status has been rejected by the U.S. Supreme Court.

The court's decision means that the 1974 suit launched against AT&T and the Bell System by the Justice Department will come to trial. Discovery proceedings in preparation for the trial phase of the suit had been suspended pending the Supreme Court review on the jurisdictional aspect.

AT&T had claimed that being subject to regulatory control by the Federal Communications Commission and state regulatory commissions gave it immunity from antitrust prosecution. AT&T earlier had attempted to go directly to the high court with its appeal after a U.S. District Court had ruled against it. However, the Supreme Court ruled that the lower court ruling first had to go through the appeals process.

In effect, the Supreme Court ruling upheld the findings of both lower courts that Bell would have to defend itself against the Justice Department's charges.

The government suit seeks to force AT&T to divest itself of its Western Electric manufacturing facility and its Long Lines division, which handles long-distance calls.

In its claims before the courts, AT&T had said the suit would cost about $1 billion, more than any other case in antitrust history, and it contended that the public should be spared the burden of shouldering this cost.

After the Supreme Court ruling, AT&T chairman John D. deButts said the phone company was disappointed at the court's findings.

Another Setback for Ma Bell

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — The Federal Communications Commission (FCC) has denied a request from the telephone industry to stay implementation of the FCC's registration program for telephone equipment.

At issue was a request to hold up the registration program that would allow using customer-provided equipment as the first or primary instrument at a user loction.

The commission, in rejecting the request, said it was planning to initiate a proceeding within the next few weeks to examine the benefits of the AT&T-fostered proposal covering primary instruments.

Under AT&T's primary instrument concept, the first phone at a customer loction would have to be provided by a phone company, with the user free to install other noncarrier units after that.

In the meantime, issuance of a stay would be contrary to the findings of the 1968 Carterfone ruling, which gave customers the right to connect noncarrier equipment to the phone network, the commission said.

The FCC certification program will substitute standard plugs and jacks for the connecting arrangements formerly required. The program will apply to all data equipment that has passed FCC type acceptance procedures for registration and certification.

Laws Boosting Record Costs

(Continued from Page 1)

Regulations implementing Equal Employment Opportunity (EEO), the Occupational Safety and Health Act (Osha) and the Employee Retirement Income Security Act (Erisa) will account for more than 50% of 1978 personnel budget costs and potential liabilities. These costs will rise significantly according to the size of the company's spending and the extent of its potential liabilities, InSci said.

For most companies, Erisa will prove the most costly and EEO will be responsible for the largest liability potential, the report added.

EEO's Impact

Currently, EEO has the greatest impact on employers, according to 40% of the survey respondents. EEO legislation will also be most subject to extension and reinterpretation and thus prove most costly within the next five years, 27% of the employers reported.

In addition, the cost of running and maintaining personnel files has nearly doubled since the introduction of Erisa in the early '70s. It will double again by 1980 as a result of the spreading coverage and recurring reinterpretation of Osha, InSci estimated.

Survey respondents also felt they will soon be strongly affected by a fourth area of compliance: privacy. Although no one knows how extensive such regulations will prove to be, nearly 60% said they believe their organizations will first feel the full impact of the privacy issue by 1979 or 1980.

In addition to budget costs, median estimates show that personnel matters take up to one-fifth of top management's time. These matters may take up to 30% within five years, and many respondents believe they will eventually take up more than 50% of top management's time, InSci reported.

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Datapoint Adds Machines Along With ARC Concept

(Continued from Page 1)

storage devices. Each file processor handles up to 200M bytes of disk storage.

A RIM box is attached to the I/O bus of each file and application processor. These special-purpose interfaces provide a unique identification for their associated processor and receive messages addressed only to that processor, the company said.

RIMs are linked to each other or can be attached to a Passive Hub — a device to physically link the RIMs.

If more than five RIMs — and therefore processors — are on the system, then an Active Hub must be used to amplify the signals. The Active Hub can link up to eight RIMs or eight other Active Hubs.

With the addition of a Hub Expander Card, up to 16 RIMs or Active Hubs can be linked into one system — giving the system a theoretical maximum capacity of 256 linked processors.

Cable lengths between an Active Hub and a RIM or another Active Hub can be as long as 2,000 feet. Up to 10 Active Hubs can be attached in tandem to the same cable, Datapoint said.

Like Packet Switcher

Firmware within the RIM boxes permits the system to act as if it were a "packet-switching" network, Datapoint said. When a processor opens a file, a pseudo-channel is established between that processor and the disk processing subsystem, with data broken up into fixed-sized packets for transmission along the coaxial bus.

The system uses Datapoint's standard disk operating system, which has been modified with special handlers to allow it to "see" the RIM boxes.

"The RIM boxes look as much like a disk controller to the operating system as we could make them," the spokesman said.

Two versions of ARC software — one for file processors and one for applications processors — must be loaded into present 5500 or 6600 systems to convert them to ARC configurations. The ARC software is distributed on cassette.

All operations of the DCIO, RIMs and hubs are transparent to the user, the spokesman said. Processors can be added, moved or deleted from a system at will; disk files can be split among two or more processors to increase system throughput at any time, the firm added.

When processors are added to the system, the joining processor causes a disturbance and attracts the attention of the polling process, which then recognizes that processor. If a processor is removed, it does not respond when polled and is eliminated from the polling list, Datapoint explained.

Accesses to specific files are handled basically on a first-come, first-served basis, the spokesman noted. The file processor, equipped with up to 128K bytes of main memory, keeps most often accessed records in main memory, thus speeding access time, the spokesman claimed.

Access Security

In most ARC systems each processor would be linked to a common bus through one RIM, communicating with all other processors in the system, but a feature allows more than one RIM to be attached to each processor.

With this feature, a user can configure a system to enable one processor to access more than one ARC system.

For example, one ARC system could include an applications processor and a file processor dedicated to personnel records. Since these are sensitive files, a user might decide it would not be wise to connect these files into an overall ARC system covering many other application areas.

Another ARC system therefore could be set up to handle all of those other applications. One processor in the middle could have two RIMs, each attached to one of those ARC systems. The people accessing the nonpersonnel applications would not be able to access the personnel files and the personnel subsystem would not be able to access the other application files.

However, the two-RIMmed processor in the center could access the files of both systems.

Up to six RIMs can be attached to any processor, allowing users to configure up to six such subsystems which could not access each others' files, or all processors could be fitted with double RIMs for duplication of the communications channel, the spokesman said.

Another way to keep files secure on the system is to allow an applications processor to have its own disk storage which can only be accessed by that processor.

Disk Storage

While in general all information filed in disk will be in the common files handled by the file processors, users can have disk storage on their applications processors for information they want to keep out of the common data base of the system.

ARC Products

In addition to the ARC concept, Datapoint also introduced several products to be used in ARC systems and which are compatible with its existing line.

Among the introductions was the 3800 series of single-user machines, which includes the 3810 and the 3820. The 3810 accommodates 60K bytes of memory while the 3820 can handle 128K bytes.

These systems can only be used as applications processors; they can generate and execute programs in any business language available to Datapoint users, the spokesman said.

3800 Series

The 3800 series processors support synchronous or asynchronous communications as well as Datapoint's Datapoll communications software and several emulators, the firm said.

Datapoint also introduced the 6000 series — a variation of the 6600 — for use with ARC. The two processors, the 6010 and 6020, contain a built-in program loader so no cassette decks are necessary. They can be used as ARC multiuser applications processors, Datapoint said.

Typical ARC System

A typical ARC system with a 60M-byte file processor, one 6020 application processor, five 3810 applications processors, three multiport adapters, one Active Hub and 24 Model 3610 Datastations costs $115,850, excluding maintenance. A three-year lease price for this configuration would be $4,938/mo.

The RIM box costs $1,397 or $50/mo to lease; the Active Hub is tagged at $987 or $30/mo; and the Passive Hub costs $100 or $10/mo. The DCIO feature costs $22,908 including installation; it can be leased for $918/mo including maintenance.

The 6020 attached processor costs $15,216; maintenance costs $150/mo and installation costs $150. On a three-year lease, it is priced at $573 including maintenance.

The 610 can be purchased for $11,616, with installation costing $150 and maintenance costing $115/mo. It can be leased for $438/mo.

The 3820 attached processor carries a $10,790 price tag plus a $150 installation fee while the 3810 costs $6,950. Maintenance is $120/mo and $80/mo respectively; the processors lease for $420 and $273 including maintenance.

Tax Suit Gets Boot

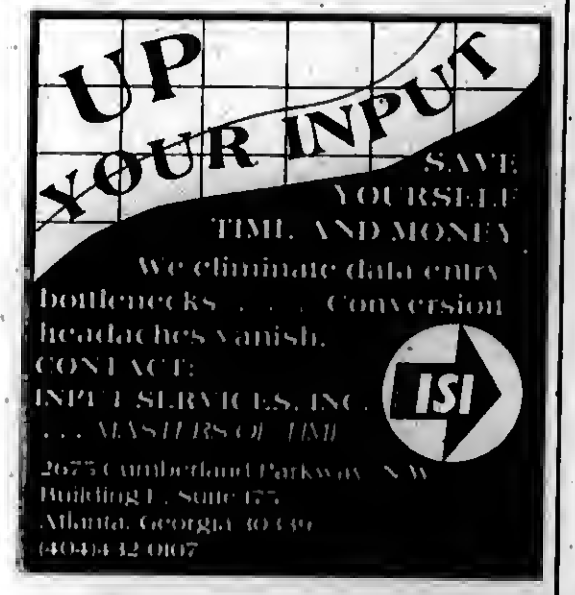
NASHVILLE, Tenn. — A suit against the State of Tennessee seeking to have the state legislature's tax statute on software declared invalid has been dismissed from the U.S. District Court for the Middle District of Tennessee.

Judge L. Clure Morton indicated his court does not have jurisdiction over the suit filed by Robert M. Sherin, because adequate remedies can be sought through the courts of the state of Tennessee. The proper way to fight taxation in this case is to await an assessment, pay it and then file a suit for a refund, Morton stated.

Sherin, president of Nova Computing Services, Inc. of Florida, brought the suit after the legislature declared software tangible and thus taxable after the state Supreme Court had ruled that it was intangible in the case of Commerce Union Bank vs. Tidwell [CW, Aug. 30, 1976].

Sherin indicated he has filed an appeal.

The state had sought to have the suit dismissed on grounds that the court lacked jurisdiction and that Sherin lacked standing to bring such an action.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Taxpayers' Records Vulnerable

GAO Faults IRS for Poor Systems Safeguards

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — The Internal Revenue Service (IRS) has failed to create adequate safeguards for its computer files and thus has opened the door to widespread abuse of confidential federal income tax records, the General Accounting Office (GAO) declared recently following a review of the IRS's data security system.

In a report prepared for Congress's Joint Committee on Taxation, the GAO charged that ill-conceived or loosely enforced IRS security precautions had left almost every taxpayers' computerized financial records vulnerable to unauthorized disclosure.

For the IRS, these findings probably could not have come at a more inopportune time.

For months, the federal agency has struggled — with limited success — to counter objections to the Tax Administration System (TAS) it has proposed as a replacement for its existing computer network. Most of the opposition to TAS has come from the Office of Technology Assessment (OTA), which, in a report issued last March, warned that the proposed system could endanger "civil liberties, privacy and due process" and could encourage surveillance and political harassment of taxpayers.

Now that the security of the current DP system has come under fire from the GAO, the OTA's claims about TAS may have gained added credibility. If so, the IRS's efforts to win congressional approval and funding for the proposed system may have suffered a setback.

Three Major Failings

Elaborating on the findings of a similar GAO report released earlier this year, the 83-page document blamed the alleged loopholes in the IRS's current data security system on at least three major failings.

The first of these problem areas — inadequate control over computer operations — has accounted for a variety of potential security risks. Programmers, for example, could easily run an unauthorized program or make an unauthorized program change with little or no fear of discovery, the GAO found.

"Magnetic tapes, each containing tax data on as many as 5,000 taxpayers, were not properly controlled and some could not be accounted for," the report noted.

The GAO also accused the IRS of serious failures to limit employee access to computer files. "Some IRS installations permitted almost wholesale entry to restricted areas containing sensitive tax data," the report said.

At other sites, supervisors failed to review tax data requests or spot-check retrieved data to make sure the requesters officially needed it, the GAO said. As a result, the IRS routinely allows employees access to unnecessary tax data.

The second major cause of breaches in data security is hardware shortcomings, the report concluded. The IRS's microfilm equipment, for example, cannot produce a transcript for just one taxpayer. Thus, when the GAO investigated 134 requests for microfilm transcripts, the agency found the documents contained unnecessary data about 2,197 other taxpayers.

The third reason for leaks of unauthorized tax data is the IRS's failure to establish or enforce strict screening procedures for current or prospective employees, the report explained.

In some instances, "IRS placed employees in sensitive positions before obtaining required reports on their backgrounds," the GAO charged. At other times, the IRS allowed General Services Administration maintenance personnel, guards and even janitors unescorted access to tax return storage areas, the report added.

Although the IRS has long claimed it has already taken adequate steps to safeguard the confidentiality of its records, the report claimed the agency has agreed with "most" of the GAO's recommendations.

Since the IRS first proposed the creation of TAS, data security has become a major concern for the federal tax bureau. Congress has already rebuffed the IRS's first proposed version of TAS on the grounds that the system might threaten taxpayer privacy, and the Office of Management and Budget, has also expressed reservations about TAS's ability to preserve tax data security.

The congressional rejection has prompted a major revision of TAS's security features, which the IRS will unveil in fiscal 1979, when it will again seek budget allocations for the system.

TAS's backers claim the system is necessary to relieve the mounting DP burden on the current computer network, which is beginning to show its age after 15 years of operation.

They also contend TAS could process federal income tax returns up to two weeks faster than the current system, which consists of six IBM 360/65s and two IBM 370/168s at the IRS's National Computer Center in Martinsburg, W. Va., plus an assortment of 80 other large mainframes at the agency's 10 regional centers.

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In Computer Inquiry II

Respondents Vie for FCC Attention

By Edith Holmes
CW Staff

WASHINGTON, D.C. – Have you submitted your reply to the "reply comments" accepted by the Federal Communications Commission (FCC) in its second Computer Inquiry? Perhaps you will want to play the game . . .

It seems that along with filing its reply comments in the public record, AT&T sent separate copies of its views on where the agency should draw the line between DP and communications to each of the FCC commissioners. These individual missives also contained additional comments by the corporation concerning the inquiry and its issues, FCC sources said.

Within days, this "additional filing" by AT&T had come to the attention of the Computer and Business Equipment Manufacturers Association (Cbema). On Oct. 21, Cbema dispatched a letter from its president, Vico E. Henriques, to FCC chairman Charles D. Ferris and the other commissioners, expressing the association's belief that if AT&T had followed such a procedure, so could Cbema.

Accordingly, the FCC commissioners received their own copies of the Cbema reply filing, along with "general observations" reflecting the positions taken by the association.

Before long, the Cbema letter came to the attention of GTE Service Corp., and for the first time, some outrage was expressed toward "unauthorized filings."

Calling the Cbema communication unauthorized and claiming violation of FCC rules, GTE maintained the association was trying "to gain an unfair advantage with respect to the other parties." This corporation, together with its affiliated domestic telephone companies, recommended that the Cbema letter "be rejected out of hand."

In the event the FCC decided not to reject the letter, however, "we ask the commission to consider this letter as a response to [Cbema's] strained arguments," GTE continued. There followed a summary of GTE's views and answers to Cbema assertions.

GTE and Cbema had in common the fact that they sent copies of their letters to the other interested parties who filed comments and replies in the inquiry.

How about it? Wanna play?

Taped Lectures Explore Security

BERKELEY, Calif. – Three videotaped lectures by Prof. Lance J. Hoffman on techniques for security and privacy in computer systems are available for purchase or lease from the University of California Extension Media Center.

The tapes, available individually or as a series, are "Authentication Methods in Computer Systems," which outlines the various methods for verifying the identities of users, terminals and systems; "Authorization and Logging in Computer Systems," which details ways of determining if a user is entitled to access a source and shows the security and nonsecurity uses of a log; and "Modern Encryption Techniques," which explores enciphering techniques that can be used to enhance security and its related software and hardware.

Hoffman is a member of the electrical engineering and computer science faculty of George Washington University and has served on governmental committees on privacy and security.

Each of the tapes is available for a one-day rental fee of $35 or can be bought individually for $450. All three can be purchased as a package for the price of $1,000 from the University of California Media Center, Berkeley, Calif. 94720.

Cepa Meeting Papers Out in Printed Form

ROCKVILLE, Md. – The proceedings of the recent meeting of the Society for the Advancement of Computers in Engineering, Planning and Architecture (Cepa) held in San Juan, Puerto Rico, is now available.

Copies can be obtained for $30 from Joe Rodgers, executive secretary, Cepa, P.O. Box 1532, Rockville, Md. 20850.

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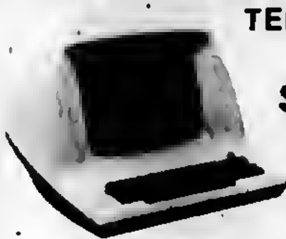

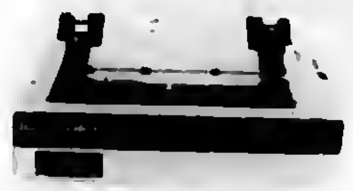

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Users' Report...

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Microwaves Sept. 1976

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Convair Managair Feb. 1977

The authors cover government requirements in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its effectiveness in competing for contracts. Excellent guidelines are given on how to analyze and respond to RFP's, RFQ's and IFB's. Simplified formulas enable accurate costing-out of engineering, R&D, service, manufacturing and production projects.

Copies of *How to Create a Winning Proposal* are available pre-paid from Mercury Communications, Inc. 730-G Mission St., Santa Cruz, CA 95060. $65 includes 3-5 day delivery inside the U.S. In California add $3.90 tax. For outside the U.S., $76 (int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

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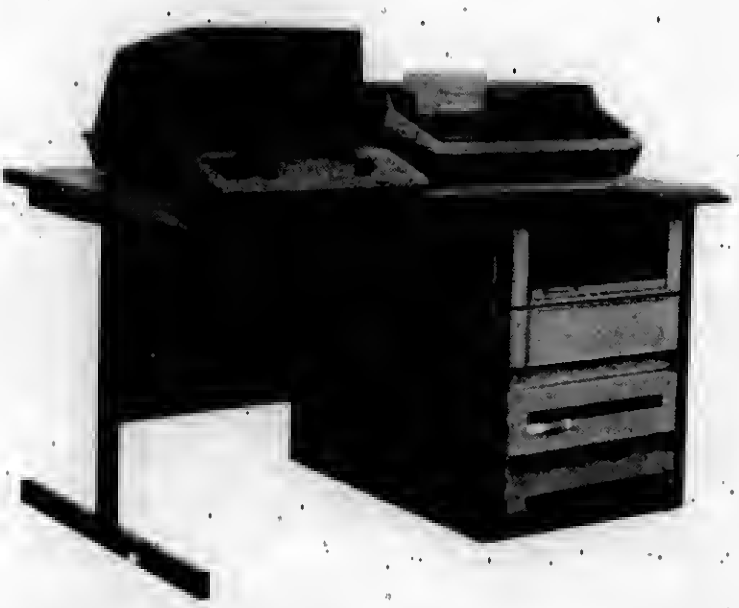

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TEXAS INSTRUMENTS.

Register to Link People and Jobs Set for February

DETROIT — Industry people looking for jobs and jobs looking for people will be matched at the Computer Science Conference's Sixth Annual Employment Register here.

Sponsored by the Association for Computing Machinery (ACM) and a number of university computer science departments, the conference will be held Feb. 21-23 at the Detroit Plaza Hotel.

The register brings together in one place a large number of employment-seeking computer people at all levels of experience and with a variety of academic degrees, according to Orrin E. Taulbee, register director. Organizations seeking to hire can thus conveniently find and interview these people, he added.

Applicants and employers must register on one of three types of official forms: (1) applicant, (2) academic and (3) business, industry and government. Employers should request one form for each type of open position and may list summer or temporary positions, Taulbee said.

Applicant and employer books of listings, consisting of completed forms, will be available at the conference.

Certified students can register free; the fee for non student employment applicants is $5. Anonymous applications cost $10, and each position advertised by potential employers costs $20.

Additional information and forms are available from Taulbee, ACM Computer Science Employment Register, Department of Computer Science, University of Pittsburgh, Pa. 15260.

Arizona Professor Wins Wescon Lottery

GLENDALE, Ariz. — Prof. Renault Catalano, an instructor at Glendale Community College here, won a lottery sponsored by Data General Corp. at the Western Electronic Show and Convention (Wescon) recently.

The prize was a Micronova minicomputer with an operator's front panel, power supply, programmer's console and interface board. The system is valued at $2,945.

Catalano's winning number, 1,295, was selected at random by the minicomputer from those attendees who entered the drawing.

Catalano intends to use his prize as the heart of a school computer that will acquaint his students with state-of-the-art technology.

Hellman: Change the Laws

By Tim Scannell
CW Staff

NEW YORK — Changes in American laws are needed to protect the individual against the burgeoning effects of computer technology, Martin E. Hellman, a specialist in computer security, contended at a conference held here recently by the Council for the Advancement of Science Writing.

Hellman believes organized crime can be expected to make greater use of computers and their ability to store data in coded form in keeping records of illegal transactions.

If such records were subpoenaed by the courts or Congress, an individual or company could refuse to reveal the key to the computer-coded information under the Fifth Amendment right.

Hellman cited as an example the recent Watergate affair involving ex-President Richard Nixon and what could have happened if the tapes had been in encrypted computer form rather than voice transcriptions.

"The records still could have been subpoenaed, but Nixon could have made a good case based on the idea that revealing the key for decoding them would not be in the interest of national security, and the contents of those tapes might never have been known," Hellman stated.

He also charged the National Security Agency (NSA) with improperly maintaining a monopoly on coding systems and promoting standards of computer security the agency itself could break if it chose to do so.

In the future, nearly all financial transactions will be conducted through the use of credit cards and electronic funds transfer, Hellman predicted. "Consider the power an authoritarian government would have in depriving someone of the plastic card he needs to spend money . . . To deprive a citizen of such a card would make him a non-person," Hellman said.

Hellman feels that restrictions guarding against using computer codes in this fashion would help to limit the possibilities of the misuse of computer technology.

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'Brute Force' Could Break It

Federal Encryption System Hit as Vulnerable

By Tim Scannell
CW Staff

The National Bureau of Standards' (NBS) encryption system for federal computers, endorsed by the National Security Agency (NSA), was designed to be just secure enough so corporate spies outside outside the government could not break a user's code — and just vulnerable enough so NSA could.

This charge has been made by Dr. Martin E. Hellman of Stanford University, leader of a contingent of scientists who have warned the code can be broken.

In an article that appeared in *Science* magazine recently, Hellman contended a machine could be constructed that could break a user's code by "brute force." This involves trying every possible combination of a code's key until the right one is found, Hellman explained.

The NSA, the NBS and IBM were involved in developing the encryption system known as the Data Encryption Standard (DES) [CW, Dec. 20]. The NSA, however, incorporated features into DES that were classified; critics feel this was done because to reveal them would be to reveal a simpler method to break the code.

$50 to Break Code

The DES is a device that can be attached directly to a computer. Each unit has a "key," a string of 56 bits (0s and 1s) which determines how the computer encodes and decodes data.

Each user of a system can generate his own key by choosing the order of the 56 digits. Once a user's key is uncovered, therefore, crypted data can be decoded.

With a key the size of 56 bits, the number of possibilities to discover the correct key is 2^{56}, according to Hellman. With the construction of a special chip designed to try one million keys per second, it would take about 10^{11} seconds or 3,000 years to complete an analysis of all the possibilities.

If one million of these chips were used concurrently, however, the entire range could be searched within one day or sooner, Hellman noted.

The cost of each chip is approximately $10 for a total cost of about $10 million, Hellman said. Allowing for the related hardware, power supplies and construction expenses, the total cost for a code-breaking machine would amount to about $20 million.

Hellman pointed out, however, that considering the depreciation rate of such equipment, the total cost in 10 years would amount to $200,000, with the cost of breaking a user's code being approximately $50.

Hellman believes that implementing a larger key size — 128 bits, for example — would help alleviate the problem of security.

Impossible Secret

In the same issue of *Science*, Dennis Branstad, leader of the computer security project at NBS, and officials at IBM disagree with Hellman and his colleagues. They believe the DES is the best encryption device available.

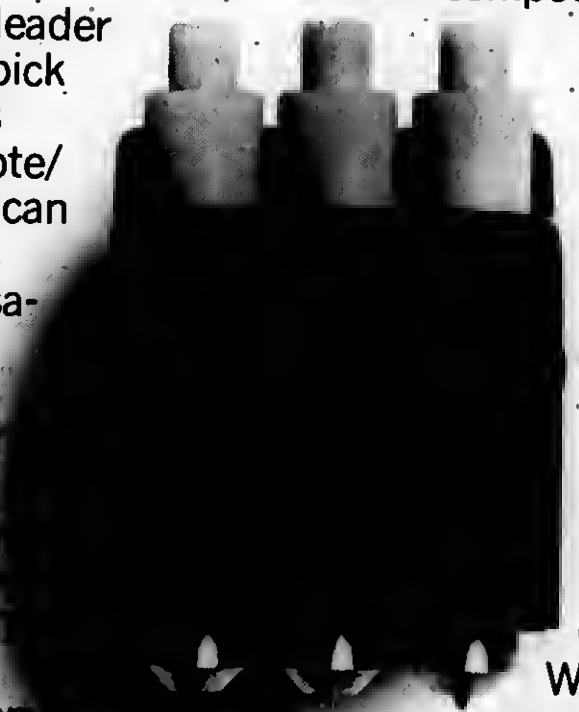
Even if a code-breaking machine were built, it would require so much power, be so large and require so many resources that it would be impossible to keep its existence a secret, they said.

IBM claimed to have spent 17 man-years of effort in trying to break the DES using ways other than brute force. Its studies concluded there are no shortcuts to breaking the code, but IBM will release no evidence that might substantiate this fact.

It is the usual practice in cryptoanalysis to document claims about the strengths of a particular system to promote its contention of being secure, according to David Snow, an official with the Mitre Corp. He questioned whether DES is secure enough to protect sensitive information, such as funds transfers between banks or privileged corporate information.

Hellman and his associates believe all of the doubts about DES could have been avoided if the NBS had chosen a scheme whose key was larger than 56 bits. IBM defended the size of the key, claiming it was chosen because it was a convenient size to implement on a chip.

Hellman contended people will accept the current code scheme because a government agency endorsed its reliability. "If the NBS tells them the DES is secure, they believe it," Hellman stated.



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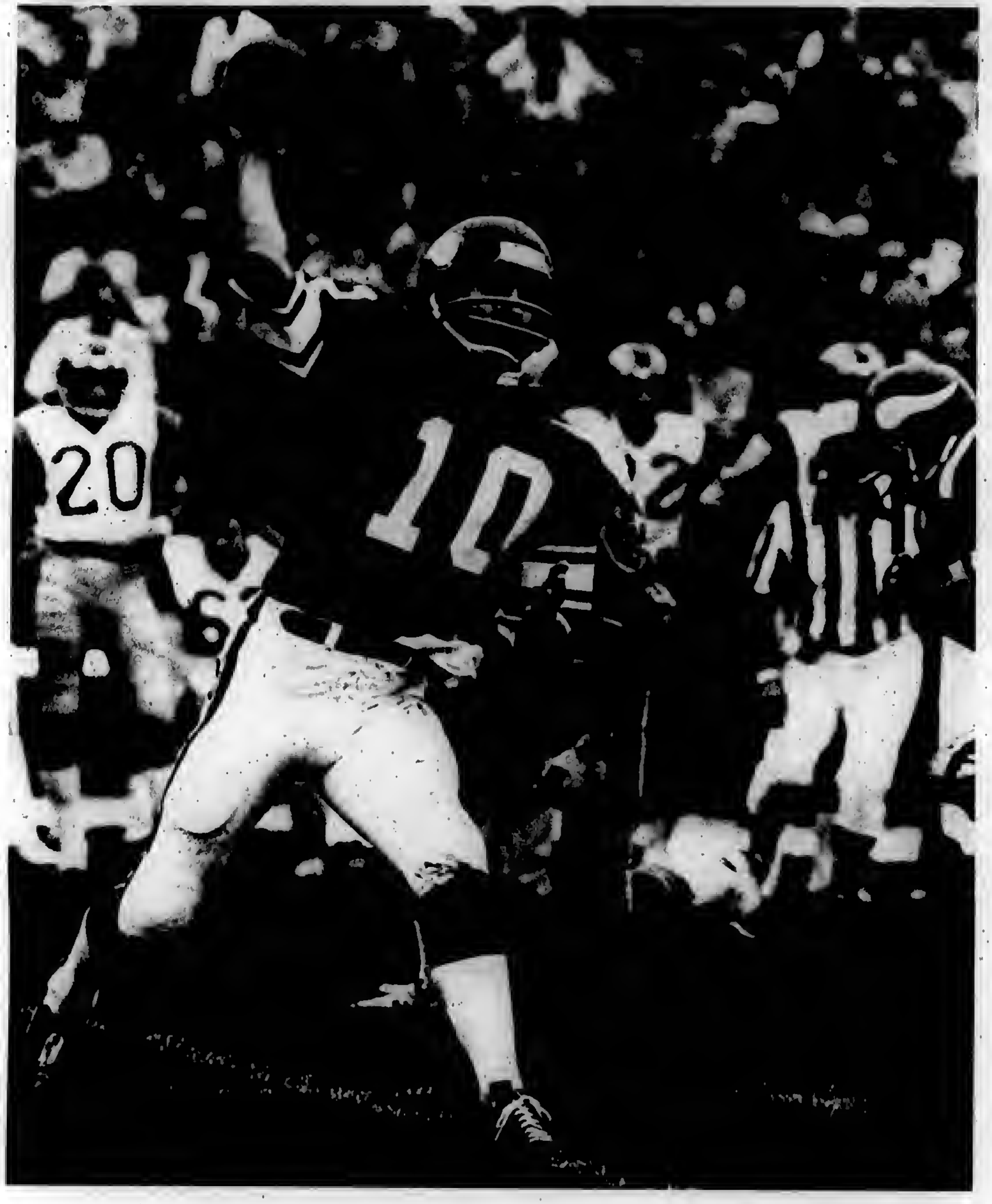

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Diebold Survey Finds
Top Firms Lack Information Policy

By Ann Dooley
CW Staff

NEW YORK — Nearly 84% of the top corporations surveyed recently by the Diebold Research Program have no overall information policy and are "only now beginning to get an inkling" that such a corporate policy is necessary, a spokesman for the research group said.

Companies surveyed were mostly financial and manufacturing organizations and all had sales of over $90 million a year. Only 26% of those companies had a central group or individual responsible for information policy, the study reported.

Some companies that reported having information policies turned out to have "relatively narrow statements" focusing on rules and records retention, access to classified data and certain specific security measures, Diebold said.

Information has become an important corporate resource and the time has come for companies to recognize that fact and establish adequate information policies, spokesmen for the research group told an audience at its 38th plenary meeting recently.

Many companies are unclear about what a comprehensive policy would be, the study explained.

Diebold defined it as a broad, overall policy that would apply to all departments so that a series of local decisions can be avoided.

Top Management Responsible

The responsibility for creating a corporate information policy must reside in top management and that person should be a management generalist rather than a functional specialist, the group suggested.

Management should consider the corporation's disclosure policy and what kinds of information should be made public, the study group suggested.

Other factors that should be assessed by management include security measures, evaluation and interpretation of information and whether the corporation has the ability to disseminate information at every level, which would be helpful in a decision-making process, Diebold indicated.

The group emphasized that in creating an information policy, each company needs to examine its individual requirements concerning the frequent problem areas of cost, organizational resistance and privacy vs. "the need to know," quality and dissemination of information and new sources of information waiting to be tapped.

Resources at Hand

Information managers now have the resources to supply a much broader information product. Today, a manager can provide economic forecasting services for specific industries from internal or external data bases, the survey indicated.

Information managers can store or tap into reservoirs of legal, technical or business information and deliver this information to users. In addition, they can pool, analyze, evaluate, interpret and disseminate statistical and textual information from all areas of the company on industrial trends, competitive activity, specific markets and technological developments, according to the research group.

Long Time Away

But the information policy idea is a "long way from taking hold" among large corporations, the group warned.

The Diebold Research Program, part of Diebold Group, Inc., is a private research organization sponsored by over 180 major corporations and can be contacted at 430 Park Ave., New York, N.Y. 10022.

Acpa Honors Isaacson

NEW ORLEANS — The Association of Computer Programmers and Analysts (Acpa) has chosen Dr. Portia Isaacson as this year's Acpa Fellow.

Isaacson was selected for her outstanding contributions to the promotion and recognition of DP.

The writer, teacher and lecturer, who was chairman of last year's National Computer Conference, is also known for her work with computer clubs and as co-owner of the Micro Store in Richardson, Texas.

"Dr. Isaacsons' demonstrated concern and interest are indicative of her high standards of professionalism and involvement," Acpa said.

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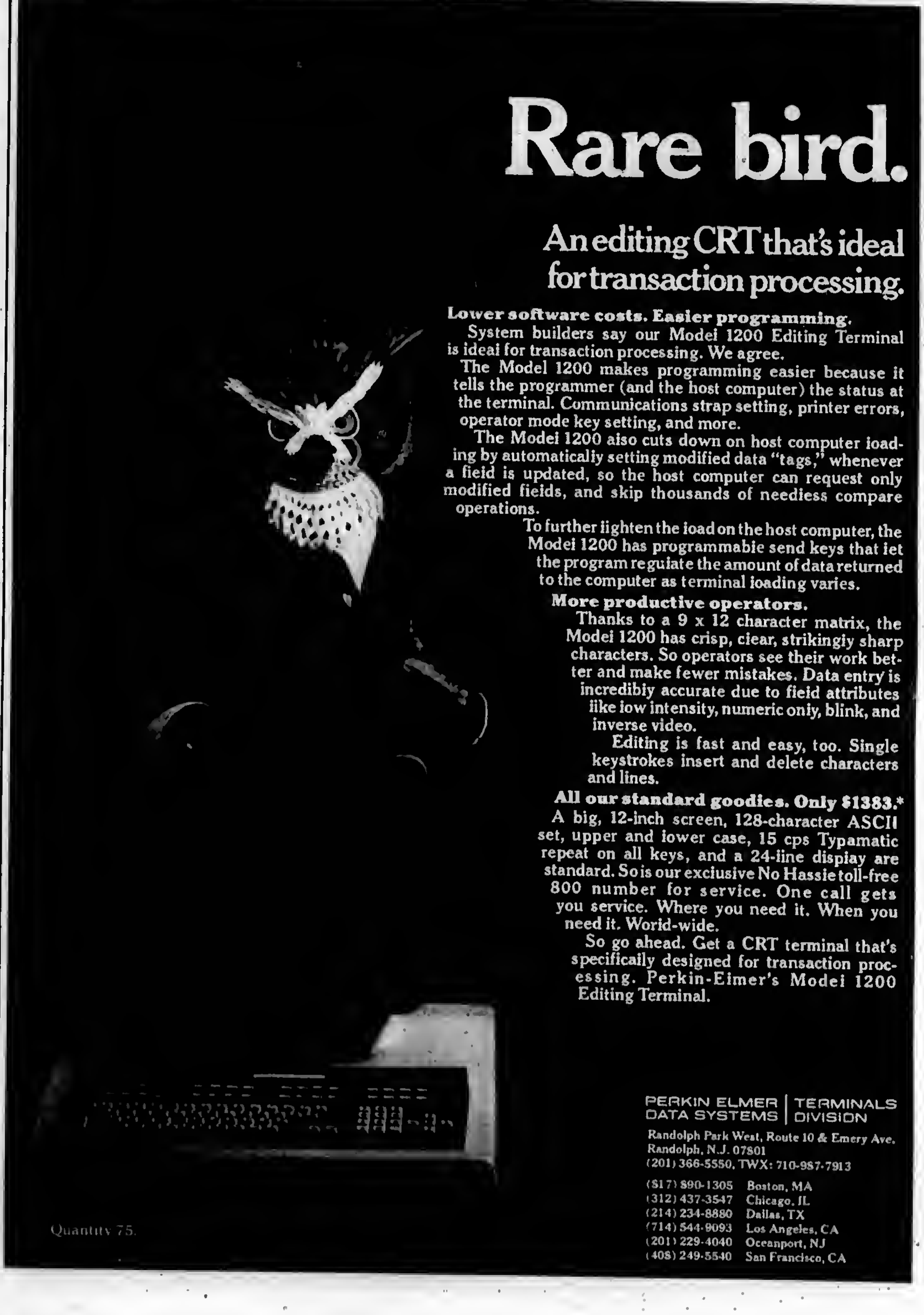

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Information Resource Manager Seen Coming

By Tim Scannell
CW Staff

NEW YORK — The expansion and rising importance of information and knowledge in the DP field is creating a new profession for the future, according to Jack I. Epstein, a member of the Administrative Management Services Division of Booz, Allen & Hamilton, here.

This new executive — the information resource manager — will be the "Renaissance man of systems" in the broadest sense of the word, Epstein said.

"This manager must have technical knowledge in several fields, experience in the design and implementation of all types of systems ... and the ability to sell systems concepts to office occupants from the top manager on down," he emphasized in a recent speech.

The information resource manager will be responsible for the integration of word, image, data and telecommunications processing into a single human information processing support system. He would use information technologies to support human processing — that is, to support a person's ability to acquire, assemble and act upon knowledge, Epstein explained.

Even though most systems executives have their own concept of the future office and its management, Epstein contended, they lack the sales ability to sell that concept to their superiors. If and when they get approval for improvements, few systems managers have both the technical proficiency and the power to effect these changes in office roles, he stated.

The success or failure of this new executive will determine the productivity and working environment for American office workers and managers, who will outnumber all other workers during the 1980s, Epstein concluded.

Kit Introduces Students to Computers

MINNEAPOLIS — A seven-piece computer project kit for students in grades 4 through 9 has been introduced by Edu-Pak Publishing.

Designed as a motivational device, the kit provides the student with a brief history of the computer, information on how to get data into a computer and answers to a list of most frequently asked questions.

The developers of the kit hope their product can be used as part of a mathematics or science course or as a course in itself.

Included with the package is a card decoder, prepunched with the alphabet, numbers and punctuation marks; a mark-sense card on which the students can code their name and address; a printed teletypewriter tape decoder sheet; and samples of magnetic and teletypewriters.

The kits, which are color-coded, cost 20 cents each in quantities of 50 from Edu-Pak Publishing, P.O. Box 27101, Department CPK, Minneapolis, Minn. 55427.

USC Adds Chair In DP Science With Jones Grant

LOS ANGELES — The University of Southern California (USC) has been granted $1 million from the Jones Foundation for the creation of an endowed Fletcher Jones Chair in Computer Science at the School of Engineering.

The foundation awarded the grant in recognition of the progress already made by USC in the area of computer science and because of its concern for computers in modern society, according to Dr. Zohrab A. Kaprielian, dean of the engineering school.

Separate Department

Courses in computer technology have been offered by the engineering school since the early 1950s. In 1976, computer science became a separate department and moved into the university's Henry Salvatori Computer Science Center.

The Jones Foundation was established by the will of the late Fletcher Jones, founder and chairman of the board of Computer Sciences Corp.

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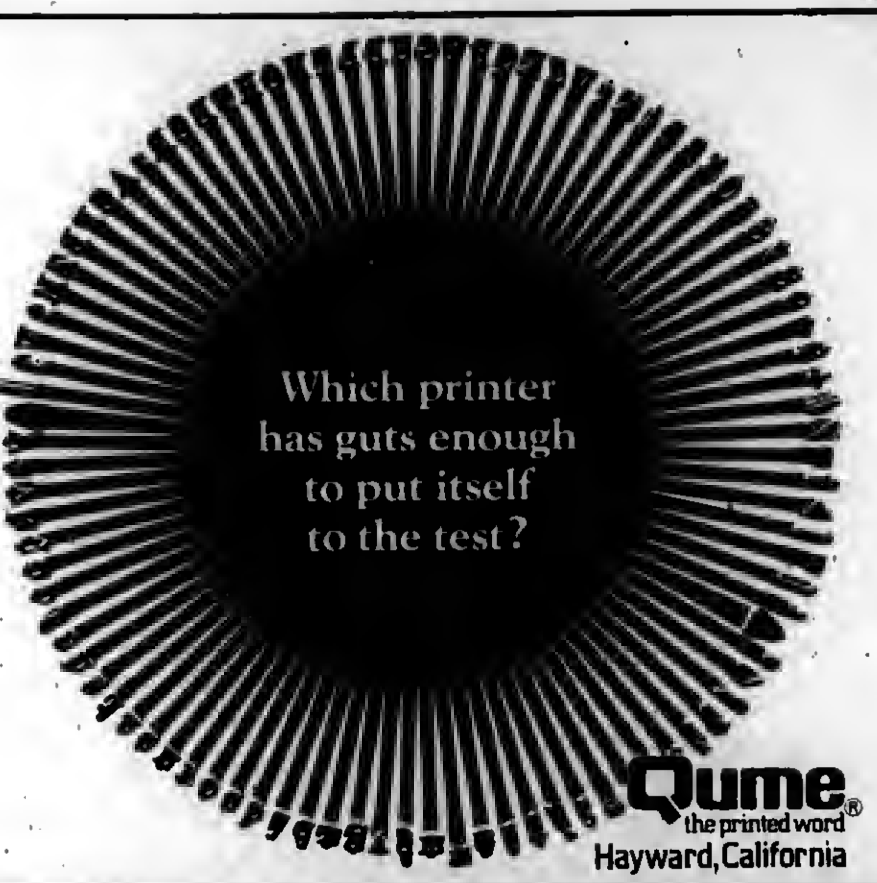
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Executive takes aim, but secretaries developed Swing.

Golfers' 'Swing' Proves Aid

TOKYO — A group of computer company secretaries who were sick and tired of manually calculating their bosses' golf rankings for the firm's annual competition here have developed a computer program to do the work for them.

Known as Swing — or Score Writing Information for Golf — the program has been refined by the secretaries' employer, Nippon Univac Kaisha, Ltd. (NUK), the Japanese computer marketing firm jointly owned by Sperry Rand Corp. and Mitsui & Co. Ltd.

Trial Run

The program was first used this summer when 170 players from 36 companies in the Mitsui Group, one of Japan's largest industrial concerns, met for the First All-Mitsui Golf Competition at the Nasu Sunland Golf Club, about 125 miles north of Tokyo.

Prior to the competition, all the participants' names, dates of birth, handicaps, team names and company names were entered in the files of a Univac 1108 computer system used by the Nippon Univac Sogo Kenkyusho Co., a NUK subsidiary. A portable terminal for entering score data was linked to the computer and a closed-circuit television set placed in the clubhouse to display the results.

Players Ranked

Upon completion of a game, the gross score of each player was fed into the terminal, which transmitted the data to the computer. The Swing program calculated the net scores and determined player rankings.

This information was displayed on the clubhouse television set almost instantaneously so the players could groan or cheer — depending on their individual results — at the prize-awarding party held after the tourney.

Directory Lists Southeast Sites In Eight States

ATLANTA — Correct Images, Inc. has announced the publication of a directory containing information on DP installations and vendors in eight Southeastern states.

"The Southeast Directory of Computer Installations" contains approximately 1,300 entries, each with the company name, address, phone number, key contact, hardware, languages, applications and computer time availabilities, the company said.

The directory will cost $60 per copy before Dec. 15 and $85 thereafter. Correct Images is at Suite 22-0, 300 Peachtree St. N.W., Atlanta, Ga. 30308.

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GM Sees DP Directing 90% of Manufacturing

By a CW Staff Writer

DETROIT — Ninety percent of all new machinery in General Motors (GM) manufacturing and assembly plants will be controlled by computers within 10 years, according to Elliott M. Estes, president of the firm.

A recent study estimated the use of computers in GM's manufacturing process will increase as much as 400% between now and 1982. This is compared with a 40% growth rate in the use of comptuers in the design functions and a 9% growth in data processing areas, a spokesman said.

A typical system, Estes told a group of design engineers, would consist of a number of basic, numerically controlled machining centers supplied by a parts-handling system. This would all be under the control of a minicomputer, which would in turn be supervised by a larger, main computer.

Such a system could be programmed to do work on a number of different parts within the same size range and perform simple assembly tasks.

Another computerized system Estes envisions is one that would use numerically controlled machines to paint cars. Although there is nothing unique about robots or machines painting similar portions of a car, he pointed out that to paint something as complex as the outside and inside of a car body would require a system of at least 12 machines which are constantly and simultaneously controlled.

Such a system, he believes, would be able to automatically adapt to a constantly changing stream of different kinds of automobile bodies — from station wagons to two-and four-door sedans.

This system must allow for machine failure should any of the 12 "painters" fail to function in such a way that work would be redistributed without interruption or change in quality.

Computers have already played a major role in the design of new cars by analyzing exterior dimensions and suggesting reductions to improve mileage efficiency. Estes said computers will probably be the most important among a number of relatively new tools that GM uses to comply with the impending 1985 federal fuel economy standards.

Pierce Awarded Founders Medal

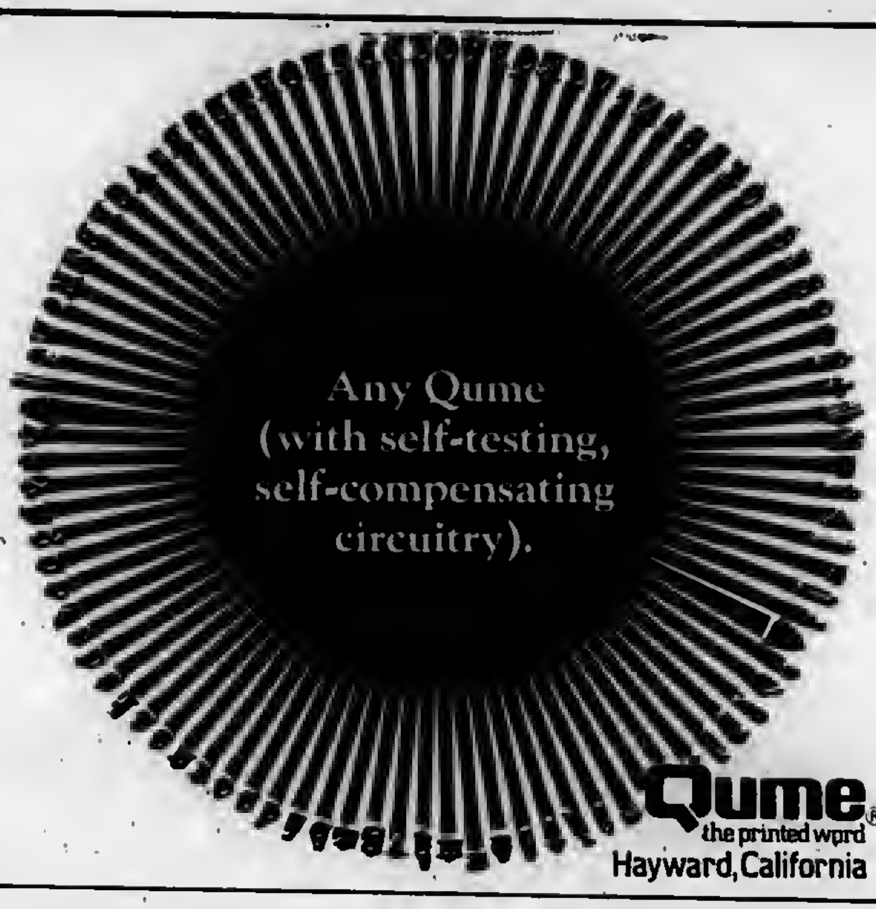
WASHINGTON, D.C. — John R. Pierce has been awarded the National Academy of Engineering's Founders Medal.

Pierce was cited for contributions in electronic communications, microwave amplification and generation, the "employment of digital techniques," scholarship and education.

A faculty member at the California Institute of Technology since 1971, Pierce is best known for his role in communications satellite development, the academy noted.

Aside from technical scholarship, Pierce has authored several science fiction stories and a few poems under the pseudonym J.J. Coupling, as well as some computer music.

'Alright, Harold — I Guess That's Enough for Today ...'



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Employee 'Threat' Groups

Team Method Urged for Outwitting Embezzlers

NEW YORK — Because American businesses lose millions of dollars annually to embezzlers, thinking up ways to cheat the company is going to be a fully sanctioned function of carefully selected "threat" teams in the future, according to a professor from the University of Virginia.

Speaking at a recent computer security conference here, Prof. Brandt Allen cited a growing awareness that traditional methods of preventing and detecting fraud must be supplemented by newer techniques like threat analysis.

As an example, he said auditors frequently cannot detect embezzlement, since catching embezzlers is not their primary function and common audit practices designed to test for fraud are not used unless suspicions are raised. Auditors are also hampered by DP systems, which they find difficult to audit.

Threat teams are composed of key employees within a company that meet as a task force on a regular basis to search for embezzlement opportunities. "Use of such teams is based on the premise that people in the best position to know how to beat the system are those who work with it every day," he said. Allen recommended that an outside moderator familiar with fraud methods be used to help guide the discussion.

Team Meetings

Threat team meetings should be given high status and approval by the company in locations such as the corporate boardroom. Participants need to be well-briefed, but not told anything before the meeting begins — to avoid the topic reaching the company grapevine, he suggested.

"If you've selected the right people," he said, "placed them at ease with the proper background briefing, stimulated their thinking with some examples and established a supportive environment, the discussion should start pretty much by itself."

Quick Scheming

How fast do they start scheming? Fifteen minutes into the first session, one threat team developed an idea that would work.

But no matter how freewheeling the group, there are certain guidelines that each moderator should exercise. Some classes of fraud such as "kickbacks, expense padding and similar known problem areas" should be avoided, he said.

Positions, Not Personalities

Individual job positions, rather than the individual occupying a particular job, should be discussed and personalities should be avoided. Schemes requiring collusion should be discussed last, he advised.

Schemes that can be executed by one person, with or without an outsider, should be discussed first.

Probing for variation on the same scheme is important. A review of basic schemes is vital since only about 10 basic schemes account for 90% of corporate frauds, Allen said.

"Corporate disbursement frauds, for instance," Prof. Allen told attendees, "are such a major problem that, if the discussion hasn't touched on it, he (the moderator) should ask something like 'How hard would it be to get a phony vendor paid?' "

Threat analysis results, as reflected on recorded transcripts, are often valuable enough to put into practice after the very first meeting.

Within six months of the threat analysis program at one company, he said, an embezzlement was detected in progress. The scheme used was identical to one discussed by the threat team. The employee charged with the crime was not a member of the team.

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Editorials

Stalling Tactics

God's mill grinds slow, but sure.

— George Herbert

The mills of government — like God's — grind slowly, but the end result is rarely sure.

Two recent cases illustrate this point with some clarity.

First, the deadline for the National Commission on New Technological Uses of Copyrighted Works (Contu) to issue its final report was extended for seven months and, second, the battle over the FBI's control of criminal history records continued [CW, Nov. 28].

In the first case, it is probably true that Contu needs more time to tackle the complicated issues raised by technology in relation to the copyright system. But it is amazing — to those with long memories — that most of the issues being wrestled with have been evident since the mid-1960s.

In fact, the establishment of Contu was a method used by Congress so it wouldn't have to tackle those issues while revising the copyright laws.

Well over a decade has gone by since the problems surfaced, but there is still no resolution and now even a further delay has been added.

On the second subject, there has been controversy over the FBI's storing and processing of computerized criminal histories since the original plan was announced — more than half a decade ago.

And while this controversy has moved into new areas, the basic issue is still whether the FBI should serve as a national police force.

Now two more bodies will study the problem — one in the White House and one in Congress.

What is needed to get these issues resolved, it seems, is a little less study and a little more leadership on the part of Congress and the White House.

In many ways, both issues are not ones that can be resolved solely on the basis of facts alone. They are issues that will require subjective decisions on the part of our elected officials.

Putting off decisions through the use of study groups and the like is easier than standing up and being counted, apparently, but these are two issues that have been studied far too long.

Operators — We Hear You

Computer operators often feel they are the neglected people of the DP community.

Too often viewed as less than professional, operators find their suggestions for improved operation in the DP department are ignored by management and their compatriots alike.

More than one DP manager has called operators "little more than glorified secretaries" who sit and type at a console or mount tapes at the discretion of a machine.

And yet operators are in many ways the people closest to the operation of a computer center day in and day out. Because of this, they often see problems that are overlooked by analysts and programmers.

Computerworld is interested in hearing from operators who have tips on improving the efficiency of DP centers — or general comments on the life of operators in general.

If you're an operator and have a suggestion or comment, write to us. We'll listen — and we'll print suggestions that either have a wide applicability or are novel in their approach.

Instead of complaining about being ignored, write to Tim Scannell — an ex-operator — at CW. It will be a service not only to your shop, but to others facing the same problems.

Data Past

Five Years Ago
Dec. 6, 1972

DOVER, Del. — The DP director for the State of Delaware charged IBM with trying to ruin his career because he chose another source for DP equipment. "An IBM representative came to my office and, in the presence of witnesses, informed me that I was 'finished' in the state," Arthur Hill, director of central DP, said.

The IBM representative, according to Hill, stated IBM had planned to support Hill in the state administration, but his decision to go to third-party leasing changed all that.

Eight Years Ago
Dec. 10, 1969

PHOENIX — General Electric updated the 600 line with its fastest system to date, the Model 655. Twice as fast as the company's earlier Model 635, the system was priced to compete at the upper end of IBM's line. Costing around the same as an equivalent-core 360/75, the 655 was less expensive and less versatile than the 360/195 in terms of what a single processor could do, the company said.

— — —

WASHINGTON, D.C. — Users responding to a Patent Office request for ideas on computer program patentability said program protection was vital if software development was to continue at any reasonable pace. But the suggested methods of protection varied.

'Would You Believe Two Hysterectomies on the Same Patient — and a Set of Twins in Between?'

Letters to the Editor

Feeble Sales Techniques

I have long felt it is very important for DP users to carefully evaluate the offerings of all vendors, not just those of IBM. In many cases, value received for dollars spent can be maximized by dealing with other equipment manufacturers.

However, I am reaching the conclusion that whatever sales success IBM's competitors enjoy is in spite of their marketing efforts, not because of them.

I am presently working on a project for my employer that will utilize a small computer system at an outlying location, supported by a large IBM installation here in Atlanta. I would like to cite two of several experiences I recently had with non-IBM vendors.

Upon seeing an advertisement in *The Wall Street Journal* for a new minicomputer, I telephoned the local sales office of the vendor for additional information. People in the office were not able to satisfactorily answer my question but promised to get back to me.

About two weeks later, the sales representative appeared at my office, without an appointment and unsure of my name, with a thick sales manual under her arm. We discussed my project at some length, but my questions again went largely unanswered. I am still waiting.

I worked for several days with another vendor of minicomputer systems who has a reputation of providing a very workable data base management system for its hardware. I wanted to set up a demonstration that would simulate the proposed system for our management. I constructed the data base and keyed data with little assistance from the vendor.

The vendor's personnel never did become familiar with the data, even during two sessions given for our managers.

I still feel we would all be hurt if there were only one vendor of computer equipment, but with competition like this, IBM may one day enjoy this position.

John D. Beck
Atlanta, Ga.

View From the Beach

The excerpt from Charles P. Lecht's *Tsunami* [CW; Nov. 21] dealing with arguments against the proposed Federal Information Processing Standard leaves me confused as to some basic issues. Lecht may indeed be an effective businessman, but as a writer he is guilty of casually vague prolixity. As an analyst, he is guilty of proceeding from unexamined assumptions.

The assumption that most concerns me is that the rapid expansion of the computer industry is a good thing, and the result for his article is that it reduces simply to a matter of whose ox is to be gored. Lecht admits that the computer industry is not consumer-oriented; I am unwilling to drop the matter there.

Where is the societal good from the rapid technological change he wishes to nurture? I do not ask this question out of a Luddite *schadenfreude* at the prospect of slowed growth, for as yet I have no clear view myself. I see it, however, as a pressing prior question.

I suppose I am suggesting that from the beach, the waves of change appear more and more like tsunami as one's nose gets closer to the water. A visit to the mountains might refresh Lecht.

Peter S. Graham
Branford, Conn.

Does NSA's DP Violate Fourth Amendment?

By Jack Stona
Special to CW

The long-suspected practice by the National Security Agency (NSA) of massive interception of American citizens' international radio communications came to light recently in an article by Deborah Shapley in Science magazine.

She reported NSA's capability for "sweeping up hundreds of thousands of simultaneous communications" is so vast that, in the words of one expert, it is "ripping open" legal protections of the privacy of American citizens. (Whither the Fourth Amendment?)

She noted that telegram and Telex messages are easily converted into a machine-readable format suitable for computer processing, but that telephone talk is really tough to convert accurately.

I concluded, however, that with the professional dedication of hundreds of NSA scientists over the next decade, blessed with billions of tax dollars and tons of secret laboratories, the automatic-speech-recognition barrier will be broken and NSA will boldly move into the thrilling new frontier of wholesale processing of Americans' overseas telephone calls.

But not without a few bugs in the system, I'll wager.

— — —

The time: April 1, 1984. The place: the catacombs of NSA/HQ on a quiet, sun-drenched tree-lined street in a village of suburban Washington, D.C. The scene: A brace of super (-duper?) computer monsters churn furiously, gorging on their regular feed — all the radio communications on earth for the past 24 hours. The occasion: USAF General M. Wellington Tarn, a specialist in helicopter tactics, has finally been okayed by the Senate as the new director of NSA after an exhaustive review of his banking connections.

The general enters the computer center with his retinue for his first inspection, an unannounced one that takes place on third shift.

The group slithers up to the console.

"Surprise!" they sing. Private Sornay, console operator, almost goes through the ceiling but recompiles himself and snaps to attention. "Sorry, sir, but we haven't had any visitors here on this shift for a long time. I'm afraid it's a bit untidy."

"Harrumph, son. Don't fret. I fully understand you are on duty protecting the security of this nation and that may require some compromise with those reactionary environmentalists.

"Now what's this thing here?" He points to the operator's console which seems to have an unfinished game of tic-tac-toe on the CRT display.

"Uh, sir, this device is used to communicate between the systems organization for computer operations and the computer's operating system's organization. That grid structure and those Xs and Os constitute the secret language we use.

The Human Connection

Gosh, it's taken me years of experience and training to come up on it."

"It does look rather complicated," he responds.

He wanders over to the high-speed printer which appears to be listing out renditions of characters from the Peanuts comic strip. "And what is this artifact doing?"

"Sir, this is the output from a hush-hush job we're doing for the CIA. Has something to do with computer-generated disguises. Scuttlebutt has it that they don't want any repetition of the Watergate fiasco."

The general nods approvingly. "Good, good. Now what's this thing here?" he asks as he picks up what looks like a stack of 45rpm phonograph records rigidly fixed to a rod running through their centers and separated from each other by about half an inch.

He notes its label is "foreign intercepts" and blows off the dust and spider webs. "Sir, that is our ultra mass storage used to record telephone conversations on non-English-speaking Americans," Sorney volunteered.

"We don't mount it very often since it's not much fun to listen in if you can't understand the language. We really have improved the morale around here since we directed all of our resources to English-language intercept only.

"Man, some of those phone calls are really wing-ding! Watch this. I'll enter four key words into this special console: German, killer, hijacks, airplane. Now listen to that loudspeaker for the response."

The speaker crackles with, "Hey, Joe! Shelley Berman here. Listen to this killer. Some guys are playing Jacks Hi and — waita-second — oh, thanks, Scotch plain, no soda — anyway, those guys — ".

The private shuts it down fast, saying "General, we still have a few systems problems ... Hey, watch it! Don't trip over the input cable! Oh, oh, you broke it!"

And so the American people were at last emancipated from one dimension of their electronic bondage ... but only for the 10 minutes it took Pvt. Sorney to solder the wire.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Analysis Shows Complexity of DP Liability

The Taylor Report

By
Alan
Taylor
CDP

Judge Motley's comparisons between architect/client and DP specialist/client relationships — brought out at a recent pretrial hearing of the F&M Schaefar suit against Electronic Data Systems Corp. [CW, Nov. 28] — point up significant similarities and differences between the two professions. Both are complex, so the layperson faced with professional discussions and recommendations cannot be expected to have the competence to check them out for himself.

Both also combine science and art. The architect knows the strength of materials and the building codes that are necessary on the site, and yet has, as his prime competitive challenge, the ability to create an economical, beautiful structure. Similarly, the system designer has certain items that are scientifically based, but often the choice of some outstanding features is a purely aesthetic one. An example would be design on an on-line display or even the decision as to what displays were to be on-line.

When it comes to malpractice, this distinction between science and art is important. No one says the architect is responsible (legally, that is) for even the ugliest structure as long as the client has seen it and approved it. But the client's approval of the building's aesthetics does not carry with it an approval of a possible breach of the fire escape regulations, even if it is implicit in the artist's sketches of the building. That is in the architect's special province.

But while there are many similarities between the architectural and DP professions, it is enlightening to analyze some major differences.

First, the computer system designer currently has a much less personal role to play in creating and maintaining a design compared with an architect. Even if the client knows who the designer is, in many cases it is really the firm that is responsible for the design. In DP, firms hire designers on a month-by-month agreement, with no provision on either side that the chosen designer will handle the whole of the task. By contrast, once an architect has been chosen, he can expect, and be expected, to see the job through.

The computer system designer, like the architect, nowadays relies upon various predeveloped components, such as language compilers, operating systems and hardware, much as the architect will use elevators, window fittings and other prefabricated items. However, computer components can be changed — even after delivery and installation — without the designer becoming aware of the problem and without its being apparent to anyone. This, of course, can raise the question of contributory negligence by the designers of the various system components.

An expert in an operating system can, without knowing anything else about a system, effectively take over a whole DP system and make it use false records or give out protected information on personal matters, for example.

With the growing sensitivity to privacy considerations and the increase in fraudulent uses of computers (bank frauds up 10 times in 10 years, for instance) this vulnerability through subcontracted components is clearly much more intricate than in the architectural use of inspectable, noncritical components.

Architects, like computer designers, often sell their products to other firms who have specialists on their own staffs. However, in DP, the basic information upon which any specialist would have to work in order to see flaws in a design is simply not as available to the client-specialist as to the vendor-specialist. This is because of the use of "trade secrets" to protect software and hardware rights.

Both the vendor-specialist and the client-specialist would reasonably be expected to know the strength of an I-beam, but the controls used in a software routine or the maintenance history of a piece of hardware is often not available (and may even be lied about) to the client-specialist. This appears to put a potentially greater load on the specialist who has access to the information than on the client.

Design Modifications

The problem of modifications after the design has been created is equally important. An architect normally produces signed and dated blueprints and the builder has the responsibility of following them. In DP, the equivalent "specifications" are simply not regarded by the programmers as being truly final documents. Often, they cannot be regarded as finalized because of areas that are not addressed or inconsistent information from one part to another. Essential parts of the design may be modified — with or without the designer's knowledge and approval — many times both before and after the system goes into production.

This last distinction may require that "programmer's liability" be considered in addition to "designer's liability."

These four points — less personal connection, component changes, trade secrets and programmer changes introduced into designs — all differentiate the DP malpractice situation from the architectural one. In sum, as I see it, the differences between architects and DPers point up even more responsibilities for DPers.

Please let me know your thoughts on this matter — and those of your colleagues — so they can be passed on to other readers. Feel free to distribute copies of this article.

Letters to the Editor

IBM Document Coverage

I must protest *Computerworld's* incorrect and shabby coverage of IBM documents recently introduced into the U.S. vs. IBM trial. In tho Nov. 7 issue, CW distorted the facts In the news stories and then sued those distorted reports to draw an unwarranted editorial conclusion — "... that IBM tried to 'launder' its files in a manner that would make its position in the industry harder to detect."

From the news stories:

- A Dec. 11, 1970 memo, written by one IBM employee to one other employee with a single carbon copy was reported to be a memo "... directing company executives to 'clean out our files'..."
- Reporting on another document, a 1968 "... 'list of points to be kept in mind ...,'" CW ignored the fact that the document shows no author and no recipient and concluded that "... firm members were cautioned ..." by it.
- A 1965 set of minutes of a Management Review Committee meeting was said to be edited for public view. The proof, CW said, is that a second document labeled "... minutes of the Management Review Committee ..." is "vastly different." The fact is, however, that the second document is not minutes, but a memo sent by a lawyer who attended the meeting to another lawyer who did not attend. It differs only in that it contains more information about some matters, not *different* information about any matter.

Then, an outlandish editorial said "IBM managers were instructed to remove certain documents from their files." Not so. The important phrase in that Dec.11 memo — on which the editorial seems to have been based — is "in accordance with legal advice." That phrase reminded and cautioned the employee that certain material had to be retained. IBM offered memos containing that legal advice for inclusion in the record.

For a long time, we have followed strictly enforced instructions on records retention. As a consequence, we have bulging warehouses full of paper through which the government and others have been sifting for years. Thus, there are no hidden answers as the Nov. 7 editorial suggests, just answers that do not fit our adversaries' — or CW's — preconceived ideas.

The distortions did not end with the Nov. 7 issue. The Nov. 14 issue continued the irresponsible coverage, particularly in the incorrect article which said that certain IBM documents "equate 'national interest' with the firm's 'financial interest' ..." There is one document that uses the term "financial interest" and it does not say "the firm's financial Interest" (nor the company's financial interest, nor IBM's financial Interest). It simply says "financial interest."

CW inserted the thought that it was IBM's financial interest, even though the article itself makes clear that the memo was part of a debate about what kinds of government interest should be included within the meaning of national interest.

I hope it is very clear that I am not simply complaining about unfavorable inferences. I am also protesting the unjustified insertion of words and thoughts into your reports on the documents.

J.R. Young
Vice-President
Communications
IBM
Armonk, N.Y.

Erratum

The following paragraphs were inadvertently omitted from the conclusion of Chapter I of *Tsunami* [CW, Nov. 21]:

"As we enter the 1980s, the I/O issue is but one of the many major issues confronting our computer industry. After many years of believing some purpose might be served by a new antitrust investigation of the computer industry, I've changed my opinion as of late.

"Not that violation charges might not warrant this; judges, attorneys and courts are around to handle these affairs. But I cannot help but feel that actions started long ago in our industry are subject to the waves of technological change too, causing increasing obsolescence in their merit.

"Characterizing our industry as being in tumult, *Business Week* in April 1977 issue said at the same time that gigantic technological breakthroughs are occurring. It seems a strange time to divert the industry's resources to answer unclear complaints. Increased scientific concern to promote its interests is long overdue.

"It is time we started to view our computer technology for what it is: a national resource available and operating within our environment, the power of which provides more promise for our society than any other technological innovation in modern times. A national policy is needed, the government's long-term goals must be explained and support to our industry provided so that its current position of world leadership is not further eroded."

Charles P. Lecht
New York, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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And Withstand Architecture Changes

Rating System Must Fit CPU and I/O Units

Reader Commentary

By Kenneth W. Kolence
Special to CW

In the recent editorial "Apples and Oranges" [CW, Oct. 24], the need of our industry for a "meaningful and fair" computer rating system was correctly identified. In response to the call for inputs on this question, I would like to offer my analysis of the problem.

To begin with, the problem is not simply a problem of rating or establishing the "power" of a given CPU. We unthinkingly accept a distinction between CPUs and I/O configurations and devices, but the fact is that it is impossible to find any innate characteristics which differentiate the two classes.

The differences are only functional, and even then the differences are quite often difficult to clearly distinguish.

The editorial noted Mips rate and throughput ratings are both desired. But the former applies to just the CPU and the latter to the overall configuration.

The implication here is that both types of "power" must be determinable and, beyond that, both must be in identical units of measure. This criterion is obvious when one realizes that no innate distinctions exist between CPUs and I/O systems and also when one realizes that both the CPU and I/O powers of the system affect the throughput capabilities of a configuration.

Because of this, one must be able to express CPU, I/O and overall configuration power in precisely identical units.

A second fundamental point that leads to essentially the same conclusion arises from considerations on the use of absolute vs. relative power "ratings." In the CW ratings which triggered this discussion, the numbers given for CPU power are strictly relative to an assumed value of 10 for a 360/50. That is, a 370/168-I with a "power" value of 100 is assumed to be 10 times more powerful than a 360/50.

The simple problem with this approach is that it is completely meaningless insofar as predicting the actual capability of a configuration to process additional load in the same amount of time. The effects of available I/O power must be taken into account.

Any given 168 CPU cannot be assumed to process 10 times the load of a 360/50 CPU in the same period of time. Depending on the I/O configurations and device speeds, it may be more or it may be less.

Fundamental Requirement

Thus the fundamental requirement of a "rating" system is that it be generally determinable for CPUs, for I/O configurations (at any level, down to the device level) and for any combination of CPUs and I/O configurations. The power of any given element of a configuration must be calculable, as well as the power of the full configuration.

This in turn means that only absolute power values are meaningful in a practical sense because of the vast number of configurations needed for any relative "rating" system. Again, if the absolute power of combinations of configuration elements is to be established, then the power of each of these elements must be expressed in the same units of measure.

A third set of criteria arises from the recognition that these "ratings" are essentially an attempt to define what we mean by the term "capacity." Clearly, capacity has the dimensions of power; e.g., work per unit time.

This comes from our common meaning when we say we have run out of capacity. This does not mean we cannot complete our work, it means we cannot complete it in the time allotted.

Now, the idea of capacity as normally expressed is that capacity is *measured*, and measured relative to some workload. The idea of an absolute power rating simply does not square with this common view of capacity, and this turns out to be a critically important observation which leads to a fundamental recognition of how much absolute power ratings can be used.

There must exist an absolute power in some sense for any given combination of CPUs and I/O devices, including the individual CPU and/or I/O device. However, how much of this power can be used by a given workload will determine the rate at which the configuration or device can process the workload. Thus, different workloads will operate at different power levels, depending on the workload's characteristics.

(Continued on Page 28)

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Rating Must Work With CPUs, I/O Units

(Continued from Page 27)

The first observation from these considerations that becomes a criterion on any "rating" system is that it must be calculated from theoretical considerations, not simply measured. The reason is simple: If the "capacity" is derived purely by measurements on the actual power levels observed, then one does not know if some other workload could operate at a higher power level.

Only theory can establish what the maximum would be, and this would concurrently define the "ideal workload" for any given configuration.

All of performance tuning shows us that indeed it is possible to modify the workload (or the configuration) to obtain higher power levels, so a "measured capacity" is not a meaningful number to use in a rating system.

As a second important criterion in this set, the property (i.e., power) used to rate the capacity of configurations and configuration elements must also define the term "performance." This must be true because increasing performance generally increases the rate at which work is actually performed, and absolute capacity is the maximum possible corresponding rate.

The third criterion is perhaps less immediately obvious, but becomes intuitive quickly on a little reflection. It can be stated as follows: Any method of determining the power of a configuration or configuration element must mathematically relate directly to the methods of quantitatively characterizing the workload or any portion thereof.

In less precise terms, if we talk about the rate at which equipment can do work, then we must be able to express numerically the quantity of work represented by an application, the operating system, etc. This is necessary if we are to be able to use our values for power to predict how long it will take to complete the programs.

Unless we have this ability, the "rating" system or power values is not useful for its intended purpose.

A last characteristic arises as a consequence of having met these criteria and can be used to determine if in fact they have been met. In a secondary sense then, it too can be considered as a criteria.

This is that the theoretical calculations of capacity must clearly identify how the equipment power depends on the characteristics of the workload.

For example, for disk drives the resultant power calculations should show how power varies as a function of block size and seek time as well as byte transfer speeds. For central processors, power must be a function of internal speeds, instruction mixes and memory alignment characteristics.

Thus we see that a satisfactory system of "rating" power or capacity should give us the ability to predict the effect of changes in both equipment and the workload on the actual rate of completing the work.

The editorial stressed the need for a "fair" as well as meaningful rating system, and correctly identified the need for it to be generally accepted if it is to be of any value. In my opinion, a fair system would be one which:

- Everyone can calculate or determine for themselves, and yet which will result in the same values regardless of who does the calculations.
- Is equally applicable to every level of equipment and every form of architecture (don't forget, the rating system must apply to both micros and to full distributed CPUs).
- Experimentally can be verified at each installation.

In other words, "fair" means embodied in a general theory or methodology which will not need to be thrown away when some architectural (software or hardware) change occurs.

Dedicated, Not Unbiased

The last need identified in your editorial was for someone unbiased enough to find the way. In one sense this is difficult, because anyone interested enough to do something about the problem feels strongly, and this means he will appear to others to have biases.

Rather than be unbiased, I believe one needs to be dedicated to only using measurable, observable quantities in the development of such solutions.

I cannot measure CW's CPU power ratings by measuring a 360/50 and then a 370/168 and expect always to come up with a 10:1 ratio for two reasons. The first is the most important: it is not defined in measurable terms. The second is that the method by which it was arrived at is not precisely quantitative.

The same is true with most other comparative rating schemes. The industry will only accept as fair and unbiased techniques which are both general and experimentally repeatable in anyone's installation.

Clearly, if one accepts only some of my proposed criteria, one will come to recognize the ability to establish the power of CPUs, I/O systems and full configurations lies at the heart of a deeply important problem area. In my opinion, this is a central problem of the field of software engineering, and must be solved in a quantitative way before software engineering begins to be worthy of its name.

For this reason, I have dedicated the better part of a decade of effort to developing theory and techniques for solving these problems — software physics.

I strongly applaud CW's efforts to at least bring out into the open the problems of rating systems.. It can only be a service to the industry.

Kolence is the developer of software physics and was the inventor of software monitors. He is currently president of the Institute for Software Engineering and the founder of Boole & Babbage. He was the initial recipient of the A.A. Michelson award, given by the Computer Measurement Group.

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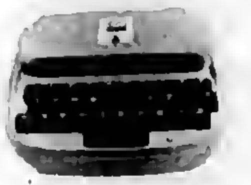

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THE TIGER Micon's Television Interface General-purpose Economy Terminal makes any standard TV set into a timeshare terminal. 1024 characters of simultaneous display are switch selectable for 8 or 16 lines of 32 or 64 characters per line. Acoustic coupler provides for timeshare use and standard RS-232C connector gives direct access. $500

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WANG

UK User Discovers

Package Eases Move to IBM Machine

By Don Leavitt
CW Staff

LONDON — Even when everything surrounding the conversion of functioning programs from one environment to another seems to be working toward making the change easy, things never seem to work out exactly right.

It was no surprise, therefore, that the people in charge of a large-scale installation facing such a changeover two years ago foresaw a great many factors weighted against the success of the effort.

But by anticipating many of the problems they would face, planning how to counter them and finding a unique software package that tackled one of the toughest of these problems by itself, they got the conversion completed on time and with a smoothness that seemed to belie the worries preceeding the project.

For various reasons, the user's name must remain anonymous, but the facts behind the effort were spelled out in a confidential report prepared by a member of the organization a year ago.

The user was faced with converting from multiple International Computers, Ltd. (ICL) System 4s to an IBM 370/145. The 145 was installed in January 1976, and the changeover had to be completed by June.

The author of the report tallied eight reasons why, in that user's context, the conversion might be more difficult than usual. In the first place, 500 programs including approximately 576,000 instructions had to be converted.

Because they had been built up over nine years, "a high degree of systems integration" had been achieved and key files were used by several applications. Thus all systems affecting these files would require testing together once they were converted, the report noted.

Because the conversion was between different manufacturers, all procedures required detailed attention. Every line of source code had to be scanned to watch for such details as the different punching instructions for the pound sterling.

Reeducation of the staff allocated to the project was a significant factor since their backgrounds were almost en-

(Continued on Page 36)

System Manages PDP-11 Data

HARTFORD, Conn. — The Quodata Data Management System (QDMS) introduced by Quodata Corp. addresses two different problems for the Digital Equipment Corp. PDP-11 user, according to the software house.

First, the system provides a solution to the needs of the non-DP-oriented end user who wants a means of maintaining and organizing data and later retrieving pertinent pieces to develop meaningful information. An English-language command structure supports this use, a spokesman explained.

Second, QDMS provides a nucleus of "building blocks" which can be used by a programmer to create new applications. These reusable blocks of code are, in effect, modules built from series of commands, each meant to handle one specific DP task.

Many man-years of development effort were necessary to evolve the underlying building blocks of the system, the spokesman claimed. These included "powerful, efficient and flexible subsystems for sorting, reporting writing, CRT display control and data base creation," he said.

The report writer has been called the backbone of QDMS. It accepts the English commands from a CRT, prompts the user and gives available options when the user tries to determine what to do next.

Facilities include calculations and totals both down and across fields including n-level control breaks and label and form letters preparation, Quodata said.

The sort subsystem can reorder any entire file or simply sort a pointer file. Both QDMS files and those created elsewhere can be reordered. Selection capability is also a part of the sort subsystem, the spokesman noted.

QDMS runs under DEC's RSTS/E environment. It costs $5,000 and is available now from Quodata, 196 Trumbull St., Hartford, Conn. 06103.

'PC/70' Update Expands Control

PHILADELPHIA — Version II of the Project Control/70 (PC/70) system, now available from Atlantic Software, Inc., is said to provide users working with almost any of the major mainframes better facilities with which to plan, monitor and account for the progress and costs of any project.

The latest release includes enhancements in half a dozen areas, a spokesman said. The self-contained spooler, for example, allows distribution of reports to be grouped by manager and location regardless of the sequence in which they were created.

At the other end of the process, the system has reduced the amount of input by generating many task assignments from a single transaction, according to the spokesman. Task estimates are computed by PC/70 based on percentage of the project budget and resources can be assigned by the system based on skill level requirements, he said.

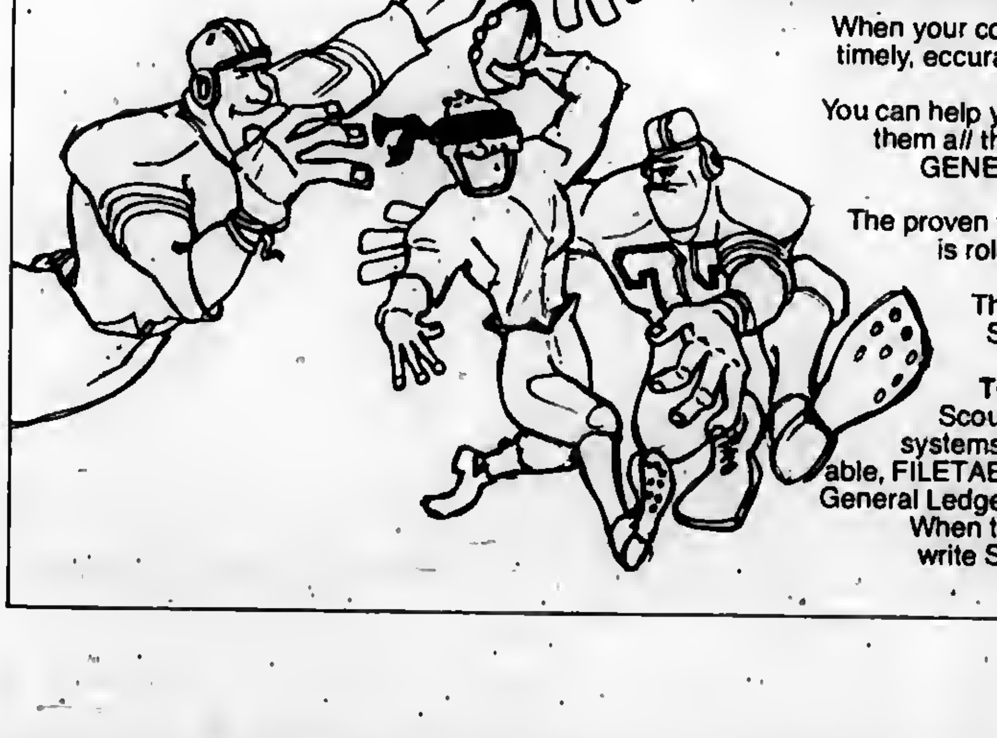
A model or estimating analysis report is said to help the user develop estimating standards based on the installation's unique environment. It also provides guidance for fine-tuning of those standards based on actual performance and makes future estimating easier and more accurate, the vendor claimed.

Version II allows the user to produce reports on current projects or to invoke the system's planning facilities on a selective parameter entered at runtime. This makes mid-week simulation runs far more practical than they have been until now, the spokesman said.

The system provides a means of showing that a task within one project is dependent upon a task in another project. This results in easier and more accurate scheduling and keeps users alert to otherwise unforeseen "chain reactions" caused by slippage in apparently unrelated projects, he added.

An automatic time printing/reporting option enables the user to eliminate time sheets, using planned times as actual time worked in a period but with a manual override facility to report significant exceptions to the expected work pattern.

PC/70 runs on Burroughs, Control Data, Honeywell, IBM and Univac mainframes. Written in ANS Cobol, it costs $15,000 and can be ordered from Atlantic in the Lafayette Building, 5th and Chestnut, Philadelphia, Pa. 19106.



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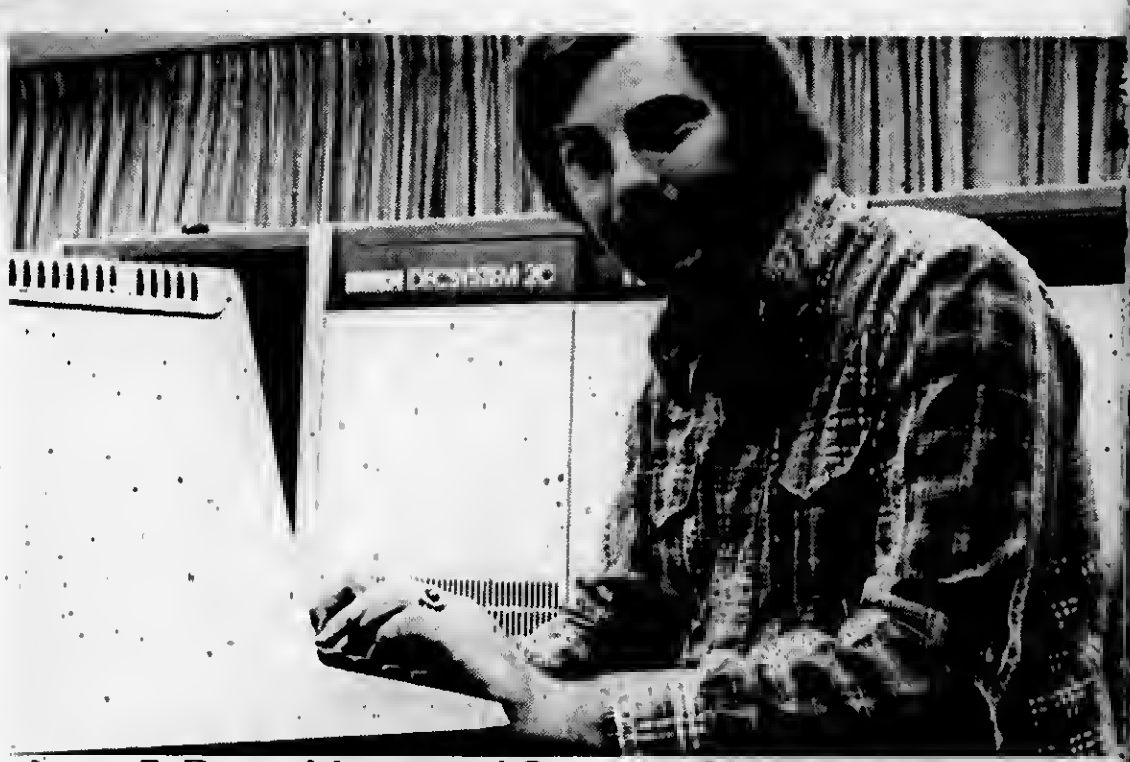

James E. Dunn, Manager of Computer Services, Linkabit Corporation, San Diego, California.

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DBMS on Infonet Works for Novice Users

EL SEGUNDO, Calif. — A data base management system (DBMS) recently installed on the Infonet remote-computing network provides four interface levels to ease the system's use by people with varying degrees of familiarity with computers, according to Computer Science Corp. (CSC), the Infonet vendor.

At the same time it announced the DBMS, CSC announced a change in the cost of disk storage on the network. A spokesman said the change could save users of substantial disk space "more than 60%" of the storage charges they faced under previous billing plans.

The DBMS, Manage, supports an interactive query facility so that nontechnical users can produce reports and create subset data bases, through English-like commands, with prompting features.

On the next level, the system includes a procedural languge that allows the user full control over access, arithmetic and logic operations.

A programmer interface permits the DP technician to utilize data in connection with programs written in Cobol, Fortran or Assembly language. Finally, a data definition language said to be based on Codasyl specifications was designed to ease the description of the user's entire data base, presumably by a data base administrator.

Manage reportedly allows the user to interrelate the data files it manages into virtually any data architecture needed. It supports both simple and complex relationships, including network and hierarchical structures, the spokesman said.

The software is completely compatible with Aladin, a data management system Infonet introduced three years ago, he claimed. Users can therefore implement new information systems using multiple Aladin files.

The reduced price option on disk storage is open to users who purchase blocks of 2,000 pages each. Such prior commitment allows the network to sell the space at less than half the standard page/day pricing, the spokesman said.

The network is headquarterd at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

As They Get More Popular

Study Sees DBMS Growing More Alike

MINNEAPOLIS — Virtually all generalized, commercially available data base management systems (DBMS) are growing more and more similar, thus placing an increasing burden on users who must evaluate and select the right system for their applications.

The findings reported in the accompanying article are the result of the first phase in a two-part research study being undertaken by Info-Dyne. To provide credibility, the company wants to expand the base of remote computing service users interviewed. Organizations interested in working with Info-Dyne are asked to contact Richard Sherman, president, at Suite 196, 4600 W. 77 St., Minneapolis, Minn. 55435.

This is one of the most significant trends to emerge from an updated study entitled "Data Base Management Systems — A Use and Availability Study in the Remote Computing Environment," one of a series of studies being conducted by Info-Dyne, Inc. into aspects of the remote computing services (RCS) industry.

This edition includes all the information contained in Info-Dyne's two previous DBMS studies plus many more products, vendors and user comments. "The significance of the data received from the initial study of users surveyed convinced us that a continuing dialog with DBMS users would be beneficial to both users and vendors," J. Richard Sherman, president of Info-Dyne, said. "The updated report provides a finely tuned state-of-the-art view of the current DBMS impact in

(Continued on Page 34)

Digest Aids CICS/VS User

HAWTHORNE, N.J. — A pocket-sized *CICS Reference Handbook* from On-Line Software International (OSI) is said to be the first complete quick reference digest compiled for the CICS/VS user. It reduces "significantly" the programmmer's need to refer to IBM's "voluminous" manuals, OSI said.

While programming, for example, the handbook may be used to get the correct syntax for both the CICS/VS macros and the new high-level language commands available with CICS/VS Version 3.1.

The location of key fields in control areas used when CICS/VS requests are issued are also provided for debugging purposes, a spokesman added.

The handbooks cost $5 each for the first five copies and $4.50 each when ordered in quantities up to 20. Further discounts are available for larger quantities; single copies ordered for evaluation are free.

OSI is at Software Plaza, Rt. 208, Hawthorne, N.J. 07506.

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- The QM-1 is an excellent design tool for analyzing software structure, system composition and hardware/software trade offs.
- The QM-1 is ideal in a computer science environment for instruction and research into hardware and software architecture.

Prices range from $190K for a minimum system configuration, capable of running Nanodata supplied software, to upwards of $700K for a multiprocessor. A "typical" customer configuration sells for $280K and includes emulators of the PDP 11, Data General NOVA, IBM 360, etc.

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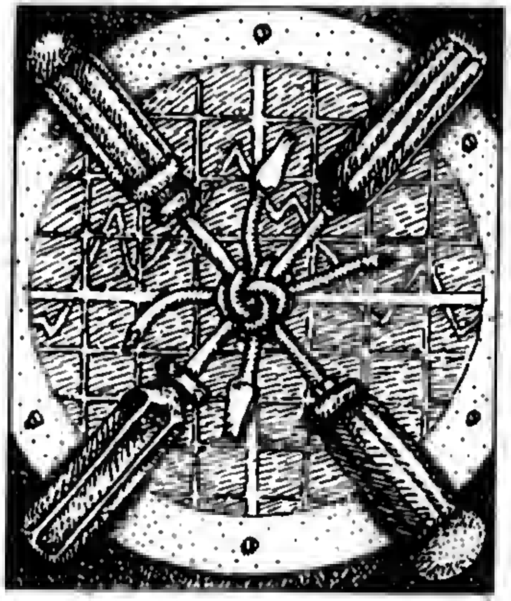

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Different Vendors' DBMS Growing More Similar

(Continued from Page 32)

the computing — and especially RCS — industry."

The Minneapolis-based firm, which specializes in consulting to users of remote computing services, undertook to update and improve the study early in 1977 after observing the impact of DBMS on the RCS industry and the importance of earlier DBMS reports. In every instance where Info-Dyne has had an opportunity for first-hand observation, a rapidly accelerating trend in the use of DBMS appears to be taking place. The new report describes the benefits of this trend, as well as the pitfalls, to user.

Also discussed is the effect on vendors. For example, in 1976 users spent $190 million with RCS vendors for DBMS and DBMS-related products. This represents a growing share of the RCS dollar, which is, in itself, a growing portion of the total computer industry.

Similar Features

Amplifying on the similarity of vendor offerings, Sherman said all systems studied in the report are now "relatively easy" to generate and to use in a conversational English-like manner. They contain "fairly comprehensive" report generators and "relatively efficient" inverted or other types of indices, he added.

Most systems can now support multiple users and files and they have flexible searching and sorting capabilities. Accordingly, in the minds of the users, the major areas of differences between the systems is not in the features areas, but rather in more vendor-oriented areas such as:

- Honesty of marketing.
- Quality of support.
- Documentation.
- Vendor staff capability and availability.
- Price.

Analysis of survey responses makes it clear that no vendor has a definite focus on any target industry or functional area, the researchers noted. "It is our feeling, however," Sherman added, "that an increasing acceptance of DBMS by users is creating the development of more sophisticated systems and the gap between users and vendors is beginning to close.

"This, we believe, is opening the door wide to vendors with an honest-to-goodness comprehensive, but still easy to use DBMS to make its mark on the RCS industry at this time," Info-Dyne said.

Cooperative Effort

This DBMS study was developed by and is continuing through efforts of the Info-Dyne consulting staff in cooperation with key RCS vendors and DBMS users. Major RCS vendors offering DBMS products were sent questionnaires to determine:

- The importance of DBMS to that company's overall financial and marketing position in the RCS industry.
- General characteristics as well as unique features of the company's DBMS products.
- Pricing strategy, billing capabilities and demonstrability.
- Marketing strategy and technical support capabilities.
- Operational characteristics relating to hardware capabilities for evaluation of throughput and turnaround efficiency.

Concurrently questionnaires were sent to large corporations and other DBMS users to determine their exposure to and experience with DBMS products already on the market. Questions related to the relative importance of the following factors in the procurement and use of DBMS products selected:

- The multitude of special features.
- Desirable characteristics of DBMS vendors.
- Pricing and billing considerations.
- Reaction to vendors' marketing techniques.
- Future plans for DBMS usage and the areas of influence reflected in those plans.

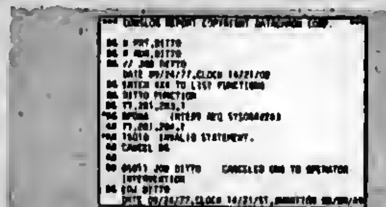
The significant areas studied and features of the new report include a new section narrating a DBMS overview, the usage of a DBMS, the role of the data base administrator, Codasyl's DBMS terminology and other DBMS terms, a DBMS language profile and the effect on controlled data processing experienced in the use of a good state-of-the-art DBMS.

Memory Utilization

The report also covers memory utilization of the system that supports the DBMS, general requirements to operate concurrently in core with other systems and programs, file and record size limitations and DBMS handling of multiwrite situations involving the same file, techniques use for indexing and searching for data, audit trail and rollback capabilities and the importance of archival backup files.

Numerous variations of pricing techniques (including the problems relating to unit pricing and fixed pricing) and pricing trends ad recommendations are also discussed, Info-Dyne noted. In all aspects highlighted above, differences as well as similarities are discussed, according to Sherman.

The Info-Dyne report includes a discussion of trends and observations of questionnaire reponses. Included in this section are recommendations for vendors with respect to marketing and pricing strategies which should give them a highly competitive position. The report also includes 16 tables presenting a comparative analysis of the different areas covered.



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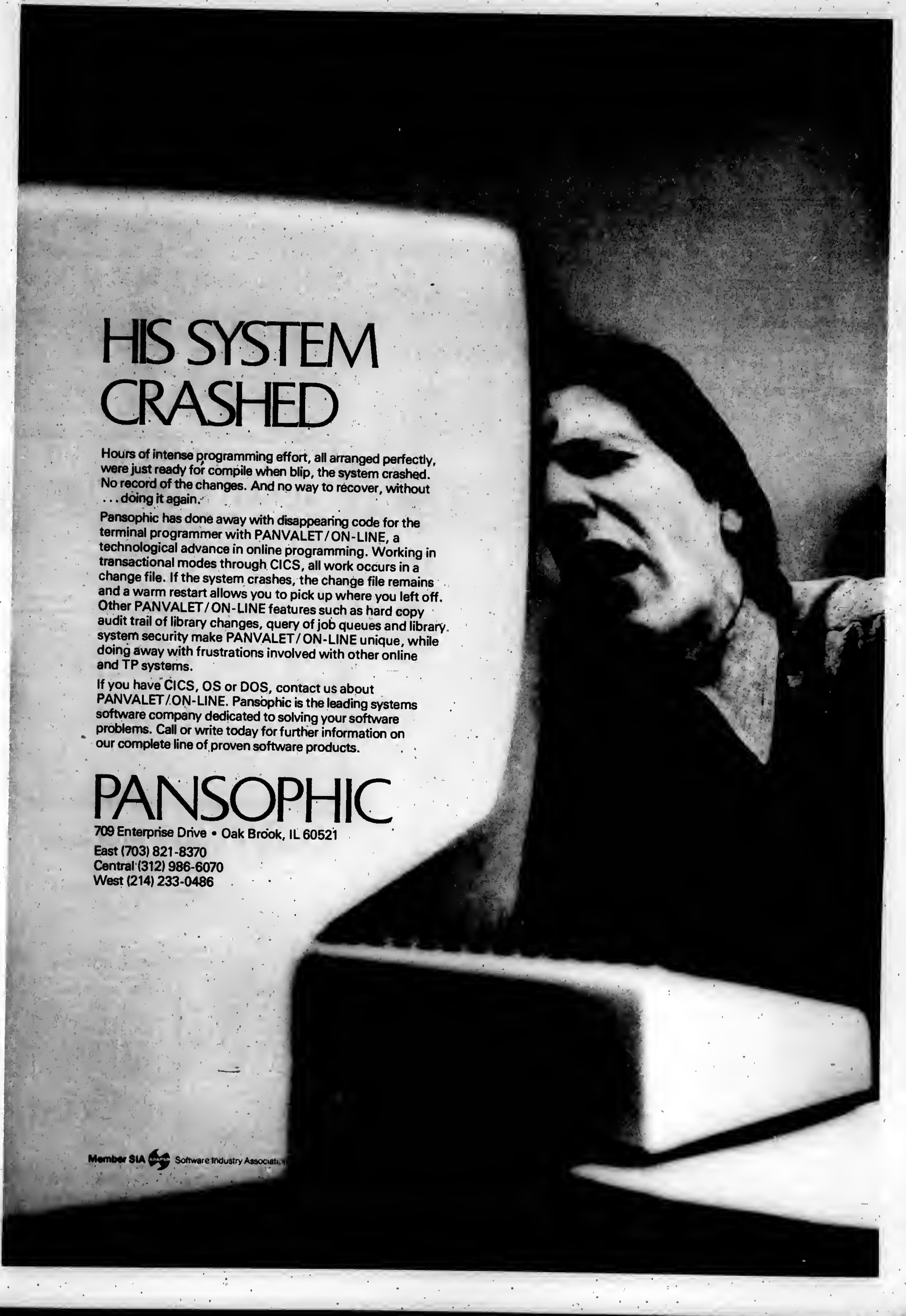

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Fortran Subroutine Library

'Edition 6' Adds Eclipse Support

HOUSTON — International Mathematical & Statistical Libraries, Inc. (IMSL) has announced the release of Edition 6 of its Fortran subroutine library. In addition to new subroutines, Edition 6 includes a subset of the library for Data General Corp. minicomputer users.

The IMSL package includes programs grouped into 16 categories. The 36 new routines are in the areas of random number generation, cluster analysis, regression analysis, differential equations and Bessel functions, according to the company.

The DG subset is said to include "a major part" of the library and to be available for use on Eclipses under either AOS or RDOS. The library generally can be used on Burroughs, Control Data, Digital Equipment, Honeywell, IBM, Univac and Xerox mainframes.

The library is available to mainframe users on a subscription basis for $1,220/year with discounts offered for educational institutions and for multiyear contracts.

The package costs DG users $1,220 for the first year, but $750/year thereafter, an IMSL spokesman noted from the Sixth Floor, GNB Building, 7500 Bellaire, Houston, Texas 77036.

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Package Eases Conversion

(Continued from Page 29)

tirely with the ICL gear. ICL's stated plans to refuse engineering support to its System 4/50s after May 31, 1976 added to the pressure while personnel assignments to cope with degradation in performance of the ICL CPUs diluted the effort available for conversion.

Finally, the report noted, having the mainframes located 10 miles apart meant "there could be considerable communication difficulties" in making sure the programs and files were identical at both sites. And a company policy banning all overtime also had a negative impact on what could be done.

The conversion team recognized the complexity of IBM's Job Control Language would be the most time-consuming task it faced. Although the ICL 4/50 had a JCL, it was incompatible with IBM's and the team knew it needed more help in solving this particular problem than in nearly any other.

The team located the JOL package, marketed by Carus in the UK (and by DASD Corp. of Chicago in the US), which was designed to generate correct JCL from a series of macro statements. JOL also includes checks for internal consistency of the job procedure it creates, warning the developer of any omissions or inaccuracies.

As one example of JOL's utility, the report said the user had to switch console messages on the ICL equipment to disk files on the IBM gear. Opening and closing these files "could easily have been overlooked in manual conversion," but the omission was spotted by JOL.

Testing time in computer hours was reduced by one-third and although that was a "book" saving, not a "real" one, in this user's setting, it impressed the author of the report.

He ended his report with a plea for the company to acquire the package permanently even though, at that time, there seemed to be a real concern on the amount of vendor support that would be available if they needed it.

Software Handles Insurance Agency

LEXINGTON, Mass. — An insurance agency management system designed to run on IBM 32s and 34s permits the user to enhance policyholder service and increase agency cash flow, according to the vendor, McCracken Computer, Inc.

Written in RPG-II, the package provides all monthly updates, statements, expiration listings, premium commission and account current reports, a spokesman noted.

The package should be easily adapted to other environments, the spokesman said.

The package costs $6,000 plus installation support, if needed. McCracken Computer is at 4 Militia Drive, Lexington, Mass. 02173.

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Service Schedules Fleets

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) is offering a fleet vehicle optimizing service on its nationwide time-sharing network. The service supports a CRT graphics terminal in the fleet scheduler's office for reviewing and fine-tuning the computer-generated routes, a spokesman noted.

The Interactive Vehicle Scheduling System (Ivess), developed by Decision Graphics of Nashville, will usually reduce the total mileage traveled on pickup, delivery and service routes by 5% to 25%, he said. This might lead to reductions in fleet size, he added.

McAuto can be reached through P.O. Box 516, St. Louis, Mo. 63166.

Package Aids Medical Bills

N. HOLLYWOOD, Calif. — The On-Line Patient Billing and Accounts Receivable (OL/PBAR) package, an interactive system for billing and insurance form preparation for doctors, dentists and clinics, is written in RPG-II.

It requires 24K bytes of main memory and 10M bytes of disk storage, is available for $12,600 and is reportedly distributed in the user's choice of media.

The vendor is Occidental Computer Systems, Inc., 10202 Riverside Drive, N. Hollywood, Calif. 91602.

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Replaces Hard-Wired Controller

Processor Eases User's Net Expansion

HOUSTON — Bonner & Moore Computing Co., the service bureau division of Bonner & Moore Associates, Inc. here, has installed a programmable communications processor in place of its hard-wired controller to facilitate network expansion and enhance diagnostic capabilities for supervision and monitoring of the network.

Bonner & Moore provides remote job entry, time-sharing and batch processing for a growing list of general business and scientific companies. Among its clients are several oil companies, a psychological testing service, a shipbuilding firm, a truck line and several construction companies.

The bureau's operating system is IBM's MVT with Hasp III, implemented on a 370/155 mainframe. A Xerox Sigma 7 CPU is also installed at the company's DP facility.

A Memorex Corp. 1380 processor handles broadband transmissions between the two CPUs, as well as remote I/O devices in client facilities.

The 370 system was added in early 1976 to provide enhanced processing capacity, principally batch-oriented. The Sigma 7 handles most of the time-sharing, although time-share clients do have access to the 370 through the Sigma 7.

In the spring of 1977, Bonner & Moore replaced an older terminal controller with the 1380 processor in order to add more communications lines required by a growing volume of business.

Greater Versatilty

According to Bonner & Moore's systems manager Robert Tomlinson, "As we added new communications lines, we reached a plateau where it became more cost-effective to go for the increased sophistication and capabilities of a programmable processor like Memorex's 1380. It easily accommodates new lines and, compared to other terminal controllers, gives us greater versatility in line troubleshooting and full communications processing."

The 1380 is a digital processor designed for data communications and real-time control. It operates as a front-end processor for up to four CPUs, controlling up to 216 communications lines.

(Continued on Page 38)

Paradyne Substitute for 3277 Works with PIX-II Systems

LARGO, Fla. — Paradyne Corp. has introduced an interactive CRT terminal it said can communicate with IBM 360/370 host mainframes on an attention interrupt basis without requiring polling messages from the mainframe.

The PIX-II VDU-77, an IBM 3277 equivalent, has been designed for use in small clustered applications with PIX-II "virtual data links." Previously the PIX-II system required use of the IBM 3277 CRT and its associated controller, but the VDU-77 allows PIX-II users to eliminate the need for the IBM terminal, according to a spokesman.

PIX-II systems consist of minicomputer-based local and remote control units which "extend" mainframe multiplexer channels to allow remote peripheral devices such as the VDU-77 to operate as if they were local.

The VDU-77 operates with control functions generated in the PIX controller, eliminating the need for a separate control unit, the spokesman said. The terminal can be installed in the field on operating systems with the addition of two circuit boards.

Elimination of the mainframe polling requirement reportedly reduces by 50% the number of discrete transactions involved in each exchange of data between a terminal and a host computer. One large user found 13% of CPU time on a 370/145 was consumed in processing negative polling responses, Paradyne said.

The VDU-77 features a 12-in., nonglare screen able to display up to 1,920 characters in 9 by 12 dot matrix patterns in both upper and lower case. The terminal can display a 96-character Ascii character set in either of two switch-selectable display modes: dark characters on a light background or light on dark.

The terminal allows insertion or deletion of individual characters or full lines of screen text; full keyboard cursor control, including a "cursor home" key; tab and back tab keys; programmable function keys; and a numeric pad.

The CRT supports switch-selectable transmission speeds of 1,200-, 1,800-, 2,400-, 4,800- or 9,600 bit/sec over dial-up, private lines or satellite communications links when used with PIX-II virtual data links.

VDU-77 terminals add $125/mo to PIX-II system prices. Paradyne is at 8550 Ulmerton Road, Largo, Fla. 33541.

Sycor 445 System Manages Distributed Data Entry and DP

ANN ARBOR, Mich. — Sycor, Inc. has introduced the 445 distributed data entry and processing system.

Hardware enhancements combined with software used in earlier devices make the 445 system well-suited for distributed processing applications, a spokesman said.

The 445 system will support up to 256,000 bytes of main memory; 70 million bytes of disk storage; eight 2,000-char. CRT terminals; and a combination of bidirectional matrix and line printers.

Networking Feature

For networking, Sycor has introduced Sycorlink, a feature that reportedly provides for the linking of multiple 445 processors. The disk files on any system can be accessed by any other system in this network, Sycor said.

Sycorlink also allows any 445 in a network to share peripherals such as magnetic tape drives, printers and modems. Users can therefore increase their throughput, the number of keyboards in a network and the amount of on-line disk storage by adding additional 445s to the network, the firm added.

The 445 CRT incorporates a 15-in. screen housed in a desk-top unit that can be located up to 2,000 feet from the 445 processor.

The 445 utilizes a multiple-processor architecture to increase system throughput.

(Continued on Page 38)

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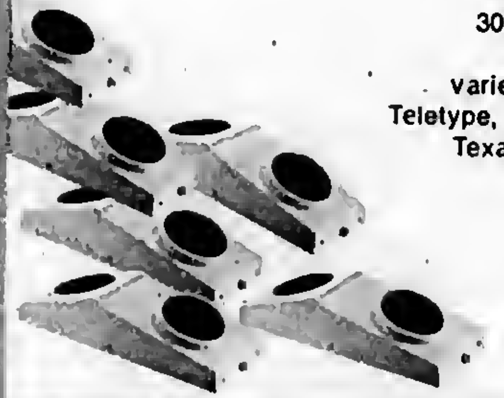

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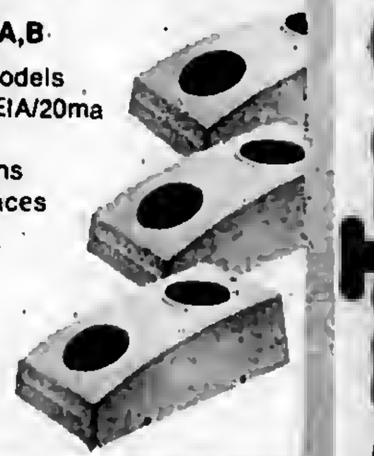

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Sycor Has 445 for Distributed Data Entry, DP

(Continued from Page 37)

In addition to the main processor, additional processors are used in each peripheral controller, thereby freeing the main processor to carry on its chief function of processing data, Sycor said.

Five printer speeds are available with the 445 system. The Sycor Sprinter, a bidirectional, microprocessor-controlled matrix printer, operates at 60-, 120- or 180 char. sec and can be located up to 2,000 feet from the 445 processor. In addition, 300 and 600 line/min printers may be used.

A range of peripherals is available with the 445 including a built-in high-speed cartridge tape for disk backup and cassette, diskette and magnetic tape drives for interchange media.

The Sycor 445 offers bisynchronous and Synchronous Data Link Control (SDLC) transmission modes at speeds up to 9,600 bit/sec.

Communictions programs available on the 445 include interactive remote job entry; 440 batch transmission using various IBM protocols, Burroughs or CDC remote job entry; multileaving workstation support; and Sycor's Network Control System, which provides automatic polling and selection of remote 445s and other Sycor systems such as 340s, 350s or 440s.

Using Sycor's IBM 3270 emulator, the 445 can operate on-line to a host computer, thereby allowing access to files at the host computer, the company said.

Small offices may be equipped with a single data station to communicate with a 445 over telephone lines enabling them to get the power and resources of the system at a fraction of the cost. These remote stations will be supported by Cobol and Basic languages, according to Sycor.

Three programming languges are available on the Sycor 445 — Cobol, Basic and TAL 2000, developed by Sycor.

Using the firm's disk spooling reportedly eliminates "data traffic jams" at peripheral devices and makes the entire DP operation flow smoothly. Multiple display stations can share a single printer or multiple printers.

Security of data on the 445 is controlled by a combination of hardware and software features:

- Optional keylock on each keyboard which allows the user to lock out all activity on the CRT.
- Program function key lockout, which allows the user to prohibit the use of certain keys thereby resticting the use of selected system facilities.
- System password protection which allows the user to specify the level of authority to use certain terminal command functions and to have access to certain disk files.
- Sycor's Guardian option which automatically saves the contents of memory when power fails, then restores it when power returns.
- Sycor's cartridge tape drive for high-speed backup of disk files.

A tyically configured 445 system incorporating 5 million bytes of disk memory, a 5 million-byte cartridge tape drive, 64,000 bytes of main memory, four CRT terminals, one Sprinter printer and a communications adapter can be purchased for $60,300. Comparable monthly lease rates are $1,397, $1,277 and $1,156 for one, two and 3-1/2 years respectively, including maintenance.

Initial deliveries of the 445 are scheduled for the third quarter of 1978 from Sycor, Inc., 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Processor Backs Expanding Net

(Continued from Page 37)

Through line interface bases connected to standard communications facilities and data sets, the 1380 can control switched and dedicated lines at speeds from 74.2- to 230,400 bit/sec, Memorex said. On operator command, the processor can also monitor, test and dynamically reroute lines among CPUs.

Various application programs can be switched among the CPUs without changing-address codes, the vendor added.

At Bonner & Moore, the 1380 controls 16 lines ranging in speed from 2,000 bit/sec to 50 kbit/sec. The lines are a mix of dial-up and leased, serving clients in the Houston area and as far away as the Northwest and East Coast.

The company plans to add at least 20 more autospeed lines (normally 300 bit/sec) to handle IBM 2741-type terminals and Teletypes. Two of these lines have already been installed for testing.

When the company decided to add more RJE terminals to the system, according to Tomlinson, it ran into a limitation on the previous controller that would have required additional hardware. At that point, Memorex's 1380 processor was evaluated and eventually selected.

The 1380 also incudes the advantages of a control console and CRT for handling line switching, troubleshooting and system monitoring, he said. Diagnostic and utility routines, carried on the processor's own flexible disk file, are brought to 1380 memory on call from any console.

This feature allows Bonner & Moore's computer operators to do their own communications troubleshooting. Through the console, diagnostics and communications checks can be run on- or off-line.

Small Modem

MIAMI — Racal-Milgo, Inc. has unveiled the CS 24 LSI central-site modem.

Because of its size, nine of the modems can fit on one shelf of a standard 19-in. rack, and 36 modems can fit in a standard 6-ft. equipment cabinet, the firm said.

The CS 24 LSI operates at 2,400 bit/sec over unconditioned two-wire dial or four-wire private line point-to-point or multidrop circuits.

Standard features of the CS 24 LSI include a nine-LED display that provides indication of EIA interface signals and modem status.

The CS 24 LSI costs $955 from Racal-Milgo at 8600 N.W. 41st St. Miami, Fla. 33166.

EFT Tests Start on Bankwire II

NEW YORK — The Bankwire network has initiated testing for Bankwire II, its nationwide electronic funds transfer (EFT) and message-switching system.

The initial tests involved communications between a switching center in Jersey City, N.J., and the Chase Manhattan Bank's central wire room in mid-Manhattan, using a DP interface at the bank and 2,400 bit/sec banknet/3 CRT terminals from Incoterm Corp. at the switching center.

With the start of this testing, Bankwire is entering the final phases of a program leading to full cutover to Bankwire II operations starting next March. After that time, the 75 bit/sec Bankwire 1, which uses Model 28 teletypewriters, will be phased out.

The Bankwire, the banking industry-owned domestic EFT system, each day processes more than 20,000 payment messages — with a value in excess of $20 billion — to provide funds transfer services to its 195 member banks. The Bankwire system is owned cooperatively by its users and is operated by Payment and Telecommunication Services Corp. and its parent company, Payment and Administrative Communications Corp.

Terminal Transactions

Bankwire II uses Collins Commercial Communications equipment at its three concentrator points in Jersey City, Dallas, Texas, and Cedar Rapids, Iowa. Transmission between Jersey City and Dallas is at 9,600 bit/sec using AT&T 209 data sets.

Messages sent to the Cedar Rapids concentrator are transmitted at 4,800 bit/sec using Bell 208 data sets, a spokesman said.

During the first phase of the Bankwire II test program, called the user access phase, one of the dual-processor switching centers and all of the individual bank terminals communicating with the system will be installed and tested.

The second starting in March, will commence with live operation of Bankwire II and full cutover from Bankwire I. Bankwire II will incorporate new message facilities as well as interfaces with a wide range of terminals and users' computer systems.

When completed, the Bankwire II system will consist of two message-switching centers in Jersey City and Dallas operating in a dual-recording mode, in which every funds transfer message is recorded twice simultaneously.

Collins is the supplier of the switching center systems. Communications lines are being provided by AT&T. The low-speed Banknet/1. and Banknet/2 terminals used in the system are Model 33 teletypewriters and Terminet 300s provided by Western Union Data Services, and the CRT higher speed 2,400 bit/sec Banknet/3 and Banknet/4 terminals are from Incoterm. Individual banks are also directly interfacing DP systems to the new Bankwire II network.

Tektronix Offers CRT Camera

BEAVERTON, Ore. — A CRT camera that features an electric shutter and changeable magnification is available from Tektronix, Inc.

The C-28 camera's electric shutter allows remote operation of the unit and also provides accurate repeatable exposure times, the firm claimed.

Two film backs are supplied with the C-28. The first is a Graflok 4- by 5-in. roll film back and the second is a Polaroid 405-type back modified to fit directly onto the Graflok back.

Power requirements for the unit are 15 Vdc which can be supplied by a calculator-type ac-dc converter.

Price of the C-28 camera is $1,085. Tektronix is at P.O. Box 500, Beaverton, Ore. 97077.

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Trendata Has Flexible Disk Unit

SUNNYVALE, Calif. — Trendata Corp. has unveiled its Model 500 flexible disk system (FDS) to operate with its terminals.

The Model 500 FDS is a communications-oriented mass data storage unit using IBM-compatible flexible diskettes.

The front control panel of the unit includes a power-on switch and four indicator lights, the firm said.

The FDS is designed for use as a 240K-byte random-access peripheral to the Trendata Model 4000A and Model 300 Trendwriter terminals. The FDS also provides communication capability to and from a remote computer in user-selectable rates of 50- to 9,600 bit/sec, the firm said.

The standard Model 500 FDS is equipped with an edit package using a "scratch pad" that does not affect main storage unless desired by the operator. One or more lines of data may be deleted, replaced or inserted in a record and new information may also be added to a record. Character string searches are possible, enabling editing within a specific line or multiple lines of data, the company said.

Communication with a remote location may be operator-initiated or performed in an unattended mode via an auto-answer/auto-disconnect feature. Data sent or received need not be printed during transmission.

The basic 500 FDS costs $3,995, which includes a standard Trendata warranty. An auxiliary printer port is available for $750. Leases start at $125/mo including maintenance. Delivery of standard units is 30 days from Trendata, 610 Palomar Ave., Sunnyvale, Calif. 94086.

Delta Data Unveils CRT

CORNWELLS HEIGHTS, Pa. — Delta Data Systems Corp. has announced a CRT terminal for U.S. users that sells for $1,795.

The Model 4100 terminal comes with editing capability, format capability (protected field) and 128 displayable upper and lower case characters. Transmission rates can be switched from 110- to 9,600-bit/sec and is available in asynchronous or synchronous mode.

Other features include full text editing capability and a 2,000-char. refresh memory that may have the data packed to allow storage of up to 125 lines of data at the terminal at one time.

Cursor manipulation is standard in terms of addressable and readable cursor as is the ability to scroll through the data in an up-and-down mode. Printer output and remote monitor drive are also standard.

The unit is available immediately from Delta Data Systems Corp., Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alphanumerics. But now there's a bright new graphics terminal that has a lot to say for itself.

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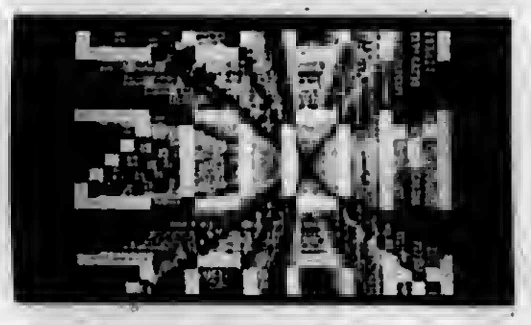

virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumerics, you can do auto-plots with or without words and figures on the screen.

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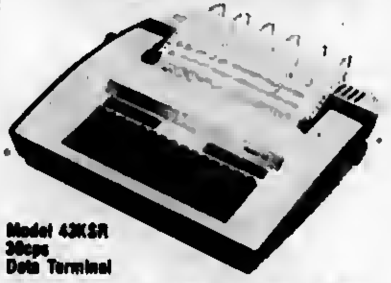

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Covers Legal, Technical Aspects

Be Specific, Guide to Contracts Advises

By Tim Scannell
CW Staff

MANCHESTER, England — "The drawing up of a contract for the acquisition of a computer and associated services (hardware, software, maintenance, training), has implications which can affect both installation and subsequent computer operations," according to a guide released here by the National Computer Centre Ltd.

Computerguide 12, Computer Installation Contracts, begins by describing contracts as one of the most important aspects to consider in purchasing both the computer and its related equipment. The contract "is therefore of concern both to users and suppliers, particularly for DP managers who are closely involved operationally and will bear the brunt of any problems," the guide states.

The guide, although based on English law, attempts to deal with many of the basic points to look for when formulating a DP contract. "It is," however, "intended only for matters which need to be borne in mind, and not as a definitive textbook."

The guide's two sections deal with technical and legal considerations respectively.

"Technical considerations refer to the computer installation itself — the environment in which it operates, its hardware, software, support services — from a contractual viewpoint and for a successful installation," it says.

The guide notes that all equipment characteristics must be specified in detail within the contractual arrangement. Features such as the weights of both packed and unpacked units and equipment dimensions such as "cable length which may impose constraints on equipment siting . . . and the amount of heat dissipated from units, both individually and collectively," must be listed.

Floor Limitations

The contract should outline structural limitations of the floor, the guide explained. This would include whether spreaders are needed and provisions for equipment mobility.

"Requirements for a raised floor should be defined," the guide advises, "with information on siting, the position and number of access points, support structures, flooring materials" and the like. "Information should also be included on door widths, lifts, hatches and storage areas for consumable materials and maintenance tools/equipment."

In dealing with security and protection, the guide instructs that "provisions to cope with possible hazards should be specified," such as "the effects of fire, flooding, explosion or acts of malice . . . The characteristics of automatic fire detection and prevention equipment should be included" like "warning systems and emergency. cut-out facilities" and fireproof cabinets. Also, "provisions to counter unauthorized personnel access should be defined," it urges.

Hardware compatibility must be covered when authoring a contract, the guide said. If the units can be physically linked or share the same software, that must also be listed in the document. "Any previous use of the equipment should be made clear, with details of ownership, history and other relevant information. Data relating to the trade-in value of the current system should also be included."

Other hardware considerations should include the possibility of system expansion with regard to CPU size, the availability of

(Continued on Page 46)

Chain's Credit Authorization Streamlined by POS System

By Jeffry Beeler
CW Staff

COLUMBUS, Ohio — A chain of 10 retail specialty stores headquartered here has streamlined its credit authorization procedure following the installation of a point-of-sale (POS) system that serves both on-line and remote-batch applications.

For the Union Co., which operates stores both here and in the Youngstown, Ohio, areas, this greater efficiency means increased throughput at the checkout counters and improved customer service, according to Susan Gould, one of the chain's systems programmers. Gould admitted, however, that the company probably will not know exactly how much the installation has improved checkout counter operations until the end of the Christmas season.

She also credited the POS system with accessing stored data at least 50% faster than Union's previous computer system. This increased operating speed has allowed the store chain to boost its batch job efficiency by about 10%, Gould added.

Before it installed its current configuration, Union performed its remote-batch tasks, which include the standard accounting functions like accounts receivable, inventory control and payroll, with a system built around an NCR Corp. Century 200 CPU.

At the same time, the company performed its credit authorization by telephone. Whenever someone attempted to buy an item whose price exceeded a set amount, cashiers at the checkout counters had to call a central office to check the customer's credit rating and authorize the purchase, Gould recalled.

Need for Larger Memory

For a while, both the off-line communications system and the earlier remote-batch system worked satisfactorily enough. But when store officials decided to add four new outlets to their chain, they realized they would need to enlarge their CPU's main memory capacity to accommodate the resulting growth in the company's DP workload, Gould explained.

The earlier Century 200 system held only 32K bytes of main memory, she said.

Store officials also recognized the potential for improved operations in their previous credit-authorization procedure, Gould added.

To overcome these problems, Union executives decided to replace their earlier computer system with a newer configuration that could provide both a larger main memory and an on-line DP capability.

During the ensuing hardware search, the officials recognized that any equipment they installed would have to be supplied by NCR. If an alternative system had come from any other vendor, a lengthly and costly software conversion process would almost certainly have followed, Union's controller William Quinn said.

At first, the chain considered installing a Century 151 system, but later officials rejected that option when they concluded that NCR had begun to phase out its Cen-

(Continued on Page 42)

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Retailers POS System Speeds Credit Checks

(Continued from Page 41)

tury line of hardware, Gould recalled.

Instead, the company opted for a member of a newer NCR product line — a Criterion 8550 computer system.

Prime Considerations

Cost and operating speed were the most important considerations in Union's choice of the 8550 over rival systems, Gould explained. After evaluating several equipment alternatives, company executives concluded they could install the 8550 for about $1,000/mo less than the cost of upgrading their existing computer, Quinn estimated.

With this economic advantage in mind, the store chain began installing the 8550 system last February. Within two weeks, the configuration had become fully operational, Gould said.

During that transitional phase, Union officials encountered a few installation difficulties, but for the most part they proved relatively minor, she added. "We had some problems getting our trunks worked out properly and getting the multiprocessor system to work properly," Gould recalled. But otherwise, the installation went fairly smoothly.

Besides the CPU itself, the system incorporates a printer and two NCR 658 disk units with a combined capacity of 200 million bytes.

In June, the company also began installing the first of its anticipated 70 NCR 280 retail terminals at its various outlets. To date, the firm has equipped all its stores with the terminals, except for four sites in Youngstown, Gould said.

Since it installed the current system, Union has quadrupled its main memory size to 28K bytes. Thus far, this increased capacity has not significantly benefited the chain's operations, despite the 10% jump in batch processing speed, Gould admitted.

"Even if [the new system] were slower than the old one, we'd still have plenty of time to run our batch jobs in the 14 hours per day we operate our computer," she explained.

But as the firm upgrades and expands its current system, this larger memory size will become increasingly important, she added.

The increased capacity has also allowed the chain to automate its credit authorization, in sharp contrast to the way the function was performed before, Gould said. As a result, Union's cashiers now have to make "far fewer" calls to the credit office than before and can provide each customer with a machine-generated sales receipt listing each item purchased, its price and other merchandising information, she added.

Stor/135 Gets 'Power-Up' Aid

BEDFORD, Mass. — Cambridge Memories, Inc. has announced an automatic power-up feature for its 370/Stor 135 add-on memories for IBM 370/135s.

This feature, which is included at no cost with the Stor/135, permits users of IBM 3135 processors to perform on-line initial microprogram loading to the mainframe system without the need to switch the memory off-line, the firm said.

The complete Stor/135 system has error-correction circuitry that detects and corrects all single-bit errors automatically plus a reconfiguration switch that permits the operator to switch out any 64K-byte sector of memory from the total systems operation. In addition, an off-line switch enables failed memory sectors to be removed from the system, a spokesman claimed.

A typical 256K-byte system added on to a resident 96K-byte memory has a purchase price of $85,000 or a monthly lease price of $2,000 with maintenance additional from Cambridge Memories, Inc., 12 Crosby Drive, Bedford, Mass. 01730.

Devoke Carrier Holds Floppy Disk Files

PALO ALTO, Calif. — A floppy disk file carrier made of rigid vinyl with see-through front pockets was introduced by the Devoke Co.

The carriers can be filed in a standard letter-size cabinet, transferred to an oversize three-ring binder or transported in a locked carrying case. A subject reference card and a label for the top index tab are included with each carrier.

The carriers sell for $1.18 in quantities of one to 10 from the Devoke Co., 3788 Fabian Way, Palo Alto, Calif. 94303.

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The 400 has everything the 200 has... and more. Built around the Z-80 microprocessor, it allows software designers to expand programs as needed without additional hardware. Capabilities include complete formating and editing with block mode transmission. Also character mode for normal log-in procedures or straight character operation.

Last but not least. Both the 200 and 400 have prices among the lowest in the industry. Only $795 and $1,095 respectively in quantities of 100. Write or call for full details.

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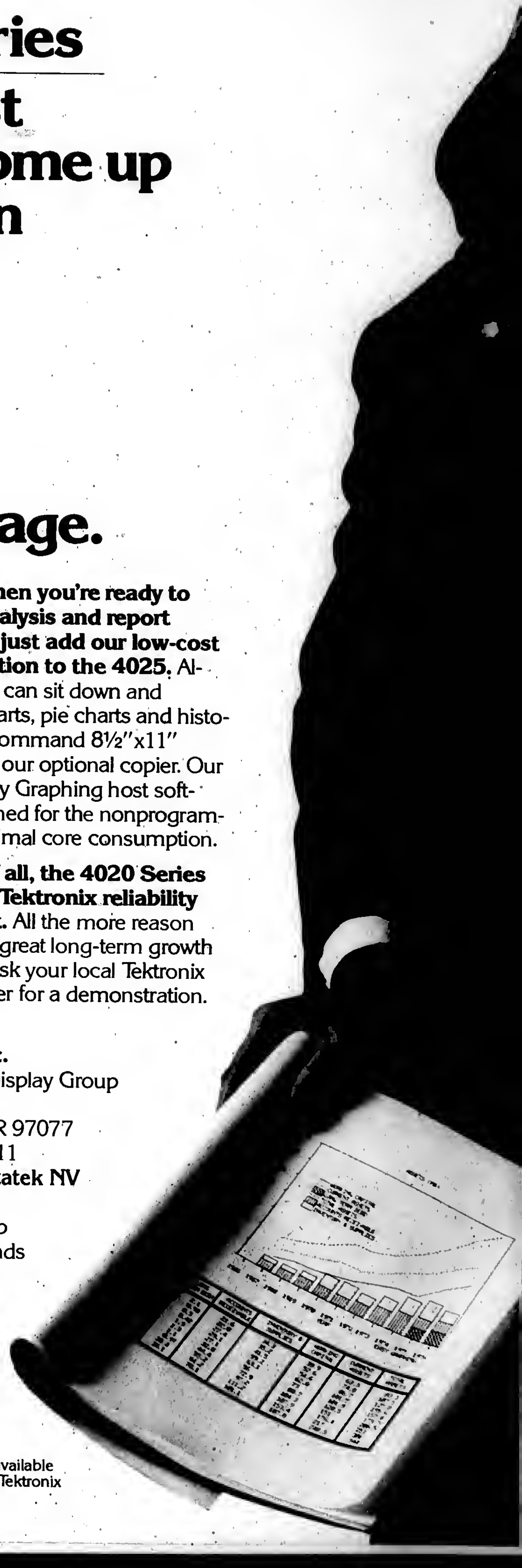

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Graphics Processor Debuts

Shown here is Computervision Corp.'s Designer system with CGP-100 graphics processor.

BEDFORD, Mass. — The Computervision Corp. has introduced a graphics processor designed to be used in conjunction with its Designer system for computer-aided design and manufacturing applications.

The CGP-100 features a memory that is field-expandable to 512K words of 16-bit memory and it operates on a 90-amp power supply, the firm said. It also has a push-button automatic program load capability with built-in diagnostics to enhance data integrity.

The Designer system, along with the CGP-100, can be used to automate the design, drafting and manufacturing process in applications such as mechanical design and drafting, numerically controlled manufacturing, printed circuit board design, schematic creation, integrated circuit design, wiring diagrams, piping schematics and map production, a spokesman added.

Prices of the Designer system, which includes the CGP-100, begin at $125,000 from the firm at 201 Burlington Road, Bedford, Mass. 01730.

Data Technology Has Flatbed Drafting Unit

WOBURN, Mass. — A flatbed drafting plotter, compatible with digital data sources that can accommodate an incremental or RS-232C interface, was announced by Data Technology, Inc.

The 3454 Series plotter operates at up to 16 in./sec and is accurate to approximately .004 inches. It has a 34-in. by 54-in. flat work area that tilts and can accommodate drawings up to "E" size.

The basic drafting unit, which includes a drive, digital servo control, incremental input and two-pen holder, is priced at $15,900 from Data Technology, Inc., 4 Gill St., Woburn, Mass. 01801.

Guide Discusses Contracts

(Continued from Page 41)

extra facilities, number of possible peripherals and the time it would take to effect a change.

Consumable materials should also be listed such as punched cards, printer ribbons and paper and stationery. Maintenance is a major part of the contract and such procedures as routine repairs, emergency service, labor costs and equipment responsibility should be outlined within the agreement, the guide points out.

Then, of course, there are such aspects as software and its maintenance, support services like training, program and file conversions, standby facilities, manuals and documentation. All of these should be made clear before a contract is signed, the guide states.

Legal Considerations

The section on legal considerations "has been written . . . so that the reader may gain some appreciation of the kind of legal detail to be considered in any contractual arrangement" involving computers.

Aside from the obvious inclusions such as the names of the parties involved, prices and delivery dates, there are other things that should be considered in the contract, the guide states.

If a contract specifies that the vendor is not liable for damage from misuse, "the user should check that the purpose for which the equipment is to be used does not itself amount to a misuse and should ask for a list of obvious misuses." The user should ensure "that the use to which the equipment is to be put is fully specified, that according to its specifications the equipment is capable of fulfilling its intended purpose."

Time limits on legal actions and limits of liabilities should also be listed and "the user should consider the possible effects on the performance of the system of using nonapproved expendable items such as magnetic tapes, disks or punched cards" and whether or not he is liable for damages incurred by their use.

Terms of cancellation or termination of the contract should be spelled out in the document. Such consequences as failure to deliver, damaged equipment or defaulting on an agreement should be listed as reasons to cancel the contract.

"The contract should call for parties to exercise reasonable care in dealing with confidential information" regarding user manuals, equipment specifications, prices or facts relating to a user's business. "Any disclosure which occurs . . . may not be actionable but there may be an obligation to require third parties to enter into similar undertakings as to confidentiality before making otherwise authorized disclosure to them."

Finally, the guide advises that the contract should include procedures to be followed in the event of a dispute, including whether settlement will be through arbitration or the courts.

The guide costs $3.44 and is available in the U.S. from the Hayden Book Co., Rochelle Park, N.J.

WITH DOCS USE YOUR 3277 AS A DOS-DOS/VS CONSOLE!

DOCS—Display Operator Console Support—provides the IBM S/360 & S/370 DOS and DOS/VS user with 3277 display unit SYSLOG support. DOCS is simply installed on any DOS or DOS/VS system with no changes required by the user. All 1052, 3210 and 3215 typewriter functions are supported by DOCS with numerous enhancements over a non-DOCS environment. DOCS also enhances DOS/VS operation on S/370, 138, 148, and 158 beyond that provided by the IBM program product.

DOCS is quickly and simply installed on any system. All that the user need do is catalog the DOCS distribution tape to his Core Image library, define where the DOCS hard copy file is to be located and execute DOCS. Total installation time required is under 10 minutes.

DOCS functions concurrently with EDOS, GRASP, DOS/MVT, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG.

DOCS is currently used in over 250 installations world-wide including diverse businesses and US Army bases.

DOCS is available from C F S, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED

DOCS provides significant through-put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre-answer messages on the console.

MULTIPLE CONSOLES

DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices.

MULTIPLE OUTSTANDING REPLIES

DOCS permits messages followed by Reads to the typewriter to remain unanswered without tying up the system. All outstanding Reads are shown in high intensity on the display console(s).

REDUCED SUPERVISOR SIZE & OVERHEAD

DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

Send requests for DOCS to C F S. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:

ELIMINATES DEPENDENCY ON TYPEWRITER

DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

NO USER PARTITION REQUIREMENT

DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

MULTIPLE EXTERNAL INTERRUPT KEYS

DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a background partition problem program. A unique interrupt key is provided for each DOS/MVT region.

Mr. Richard Goran
C F S, Inc., P.O. Box 662, Brookline, MA 02147
(617) 731-3474 Telex 94-0285

Auerbach: 16-Bit Era Not Over

By Esther Surden
CW Staff

PENNSAUKEN, N.J. — The introduction of Digital Equipment Corp's 32-bit VAX-11/780 did not "signal an end to the era of the 16-bit minicomputer." Instead, it represents an "evolutionary extension of Digital's popular PDP-11 series of minicomputers" and "offers several methods by which compatibility links can be established with the PDP-11 series," according to a special Hotline report from Auerbach Publishers, Inc.

The report noted that DEC did not introduce much business-oriented software to take advantage of the 32-bit features of its mini and that not all of the system's internal buses have 32-bit data paths.

The system is "still in the initial stages of its development," the Auerbach report contended, adding "the bulk of the unfinished development work appears to be in the software area."

For example, "language support for VAX is still in the formative stages, the report pointed out." In support of VAX's "time-critical orientation" and its users who will probably be running scientific, computational and simulation applications, DEC has released "a Fortran IV-Plus that takes full advantage of VAX's 32-bit architecture.

"All other languages, Basic-Plus-2, Cobol-74 and Macro, run on VAX in a 16-bit emulation mode," the research organization noted.

No 32-bit mode software for the commercial user has been announced, and there are "no hints of support for Digital's commercial language, Dibol. Also, there is currently no record or file management software or data base management software," Auerbach found.

The VAX system is compatible with "the most popular" PDP-11 operating system, RSX-11, in either M or S versions, the report continued. "A package called the Application Migration Executive allows RSX-11 programs with nonprivileged instructions to run on VAX 11/780 under VAX/VMS."

The system's architecture seems to be similar to that of the PDP-11/70. However, VAX-11/780 has three buses.

Two of these are the familiar Unibus and Massbus used on the PDP-11/70. Both of these are 18b bits wide and support standard PDP-11 peripherals.

The third bus, called the Synchronous Backplane Interface, has a bandwidth rate of 13.3M byte/sec. It is 32 bits wide and serves as the main data path, the researchers said.

The VAX-11/780 system report is designated No. 180.3451.150 and is available as part of the Auerbach Minicomputer Reports. It costs $10 from the company at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Minis Mean Control for Broker's Broker

By Ann Dooley
CW Staff

NEW YORK — Working with thousands of different numbers, hundreds of different clients, 76 CRTs and two minicomputers, J.J. Kenny Co., Inc. a municipal bond brokerage firm, provides the critical link between buyer and seller in the secondary bonds market.

Referring to itself as "the broker's broker," the company provides municipal bond information within five minutes to dealers and dealer banks with its automated system.

J.J. Kenny has two Digital Scientific Corp. Meta 4 minicomputers, which emulate the IBM 1130. They are linked to Computer Communications, Inc. (CCI) CRTs at each trader's desk.

The company is so enthusiastic about its computerized operations, there are 76 CRTs for its 86 employees scattered around the headquarters building, according to Richard Donnelly, vice-president and secretary.

As a municipal bond bid comes in over the telephone to a trader, he types in all the necessary information on the CRT. The CRT then displays all the daily bids available according to their declining dollar amount.

The client decides when the best price is reached and sells to the highest bidder if he wishes to. The system records, stores and invoices all the information.

The transction is completed and the system work is ended when the bonds are delivered and paid for, Donnelly explained.

J.J. Kenny never sees the actual bond, but only works as the intermediary between the buyer and seller in conjunction with a clearing agent, according to Donnelly.

The system was designed to handle the constant flow of information. After the bid wanted item is taken via the telephone, the trader rechecks a description of the item for accuracy and it is input to the CRT, which transmits it over the firm's private teleprinter system reaching 87 cities.

Once the item goes over the system, traders at J.J. Kenny wait for the calls to start coming in. Within several hours of the start of business one day, J.J. Kenny already had received 673 bids worth $25 million on file and transacted 17 bids worth $3.2 million; the system had been accessed by traders 6,441 times.

On an average day, the company handles $40 million to $60 million worth of bonds.

The public is not told who sells the bonds or who buys them since the company maintains a strict sealed bid policy, officials said.

The system has the ability to work in three modes — yesterday, today and tomorrow,

(Continued on Page 50)

Clearinghouse System Keeps Egg-Trading Operation Rolling

By John G. Stephenson
Special to CW

DURHAM, N.H. — A minicomputer has taken over many of the trading chores at the commercial egg-trading center for the U.S. A custom software system lists bids and offers to buy or sell eggs, matches bids and offers and handles billing and bookkeeping.

The Egg Clearinghouse, Inc. (ECI) operates from a modest office in this New Hampshire college town. Yet last year alone the eight-man staff traded over 300 million eggs with a value of $17 million.

Each day the clearinghouse handles calls from many of its 270 producers and buyers. Ray Delano, ECI president, wanted a system that would take most of the manual tabulation and calculations out of the egg-trading process.

The ECI system includes a file containing an identifying code for each trader. At the start of trading, a trader phones in, gives his identification and enters his bid or offer.

The system notes the location of each buyer and seller and figures the freight cost between every possible combination of buyers and sellers. It allows for this freight difference when it tries to match bids and offers and make trades.

If the system finds no trades, the mini lists the next best trade for each of the buyers and sellers. Traders can use this information to make price adjustments.

Data on each trade goes into an invoice file. Then the system prints a three-part

(Continued on Page 50)

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3270/3790 Users: Why wait for 3274s or 3276s? Raytheon's PTS/1200, the highly i
does much more. And you can get i

Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

Raytheon's PTS/1200 system is such a product. It is a fully-programmable distributed processing system that uses an easy-to-use English-language compiler, has a main memory capacity of up to 128K bytes, handles up to 32 operator displays—*plus* dozens of additional downline displays in a multipoint network control mode—and can have a large peripheral equipment complement and local data base as well.

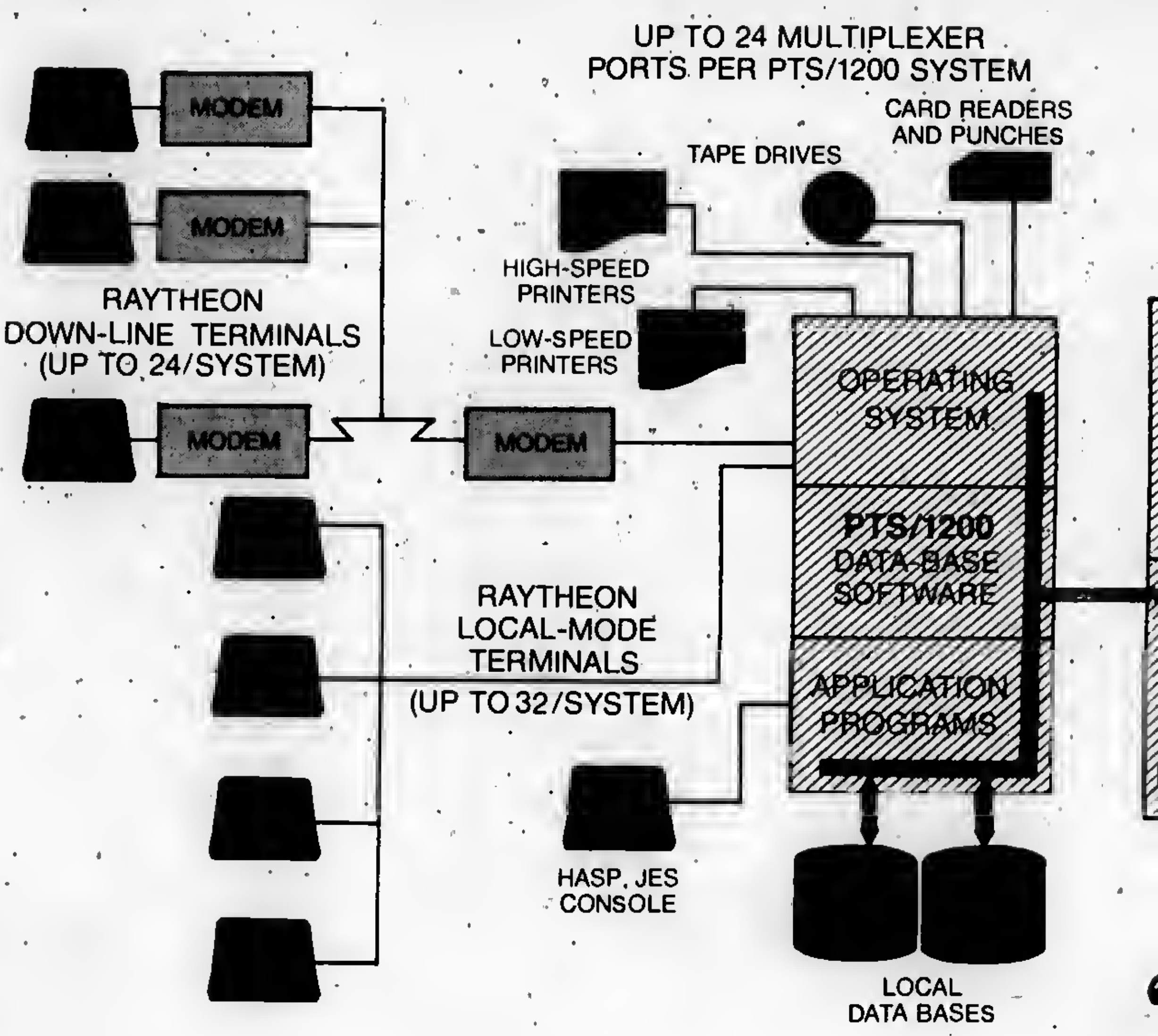
And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take dellvery in just 30 days.

Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
- ✓ Control up to 32 operator displays
- ✓ Perform local batch processing concurrently with 3270 interactive processing
- ✓ Attach up to 24 peripheral devices
- ✓ Attach a large local data base
- ✓ Perform all 3270-type data entry tasks
- ✓ Perform all 3270-type inquiry/response tasks
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

Consider these five benefits, and you'll look a lot harder at the PTS/1200: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APPLICATION PROGRAMS
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1. No Change To Host Processor

The PTS/1200 installs immediately within your existing network with no change required in your host CPU, in the 370X front-end, in your existing applications software, or in your Emulation Program. It goes to work under 3270 bisynch protocol the day you install it.

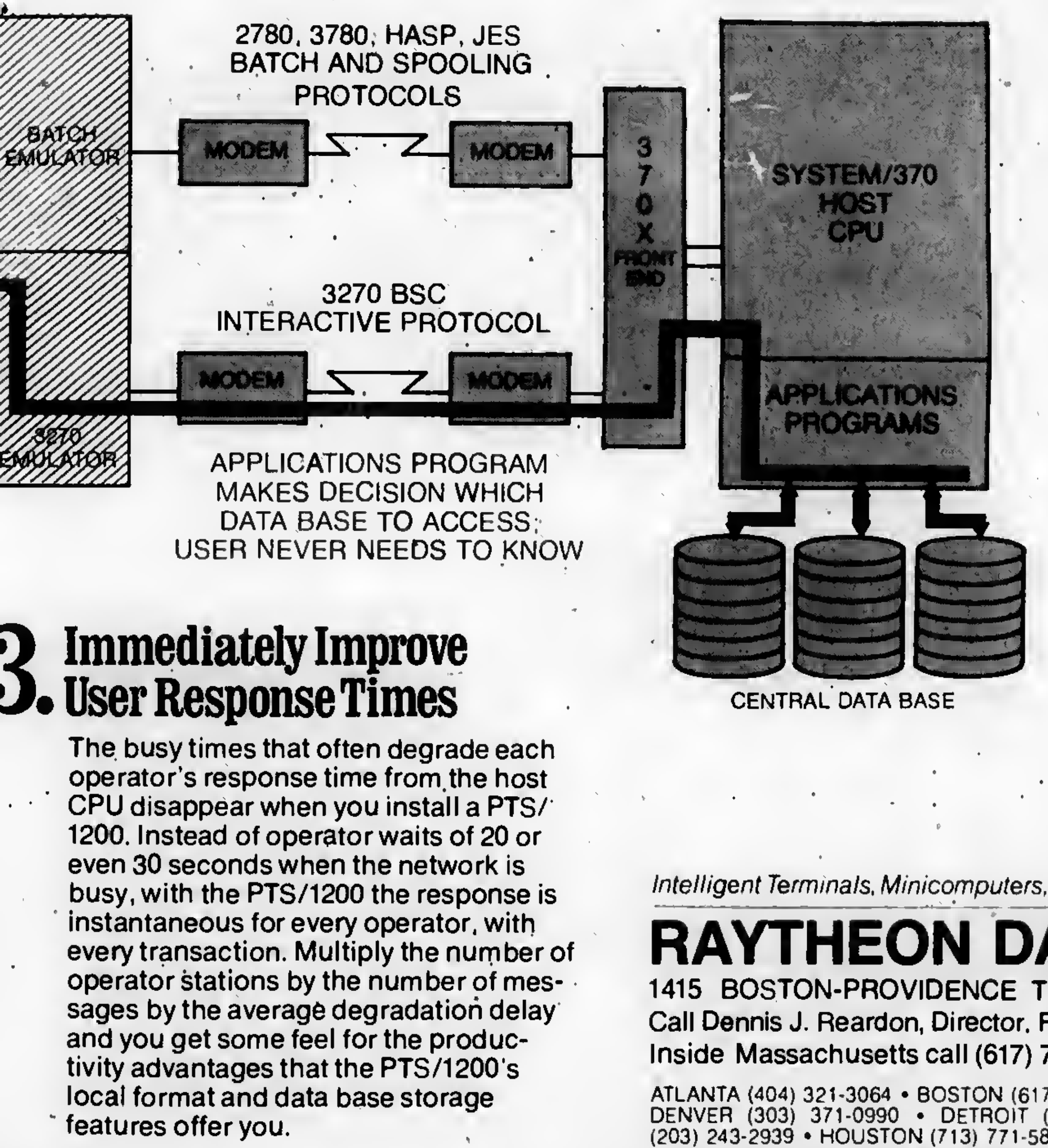
2. Cut Mainframe Overhead

The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.

ntelligent terminal system, t in just 30 days.

4. Reduce Communications Line Loading

With the PTS/1200, you perform a high percentage of the data entry and inquiry functions of a 3270 locally. In many cases, that can eliminate up to 90 per cent of the wasted communications overheads involved in polling, ACKing and NACKing, and in retransmitting. Your system becomes much more efficient in its use of communications lines.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APPLICATIONS PROGRAM MAKES DECISION WHICH DATA BASE TO ACCESS; USER NEVER NEEDS TO KNOW
CENTRAL DATA BASE

3. Immediately Improve User Response Times

The busy times that often degrade each operator's response time from the host CPU disappear when you install a PTS/1200. Instead of operator waits of 20 or even 30 seconds when the network is busy, with the PTS/1200 the response is instantaneous for every operator, with every transaction. Multiply the number of operator stations by the number of messages by the average degradation delay and you get some feel for the productivity advantages that the PTS/1200's local format and data base storage features offer you.

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Dual Minis Bring Control for Broker's Broker

(Continued from Page 47)

according to Donnelly. The complete bidding and sales of the previous day can be called up and tomorrow's program can be readied while work on the present day's bid is being done, he said.

The system relieves the trader of detail so he can handle other business, cover accounts better, handle more calls, obtain a wider range of information and avoid number-crunching problems, Donnelly said.

Using this method, the trader has more time to handle the negotiations between buyer and seller, he added.

J.J. Kenny's primary work consists of handling the bid wanted items and the active trading market.

The company keeps three minicomputer systems in-house, two in its DP center and one in its subsidiary Municipal Security Evaluation Service (MSES). Both companies have real-time, data base-oriented systems.

Previously, J.J. Kenny used an IBM 1130 system, but because of the company growth needed faster throughput. In 1971, it converted from batch processing to CRTs and then went to real time, ordering its first Meta 4 to emulate the 1130, Donnelly said.

The company did several benchmark tests before buying the Meta 4s; but was most pleased with that system's performance, he added. Many other systems were still in the development stage at that time, he recalled.

The company also upgraded to on-line communications, added disks, firmware and software. It can keep adding terminals without a decrease in throughput, he said.

The bid information that is input into the CRT includes the time the trade took place, where the bid was taken, which trader took it, the bond description, the owner, the percentage yield and concession.

Other information includes when the date of the bond will mature, the region it's from, state and interest rate.

The daily list of municipal bond offerings is stored on disk for fast availability. The system also stores information on blocks of bonds for the bond yield and its dollar equivalent.

The system can also scan all available resources to find the bond that fits a specific inquiry, Donnelly said.

After trading has stopped for the day, the system continues to work to confirm and verify all the bond trades that occurred that day. The verification process includes data on which security bond was bought and sold, the price and the accrued interest.

Internal Communications

The system also provides an internal communications network to send messages to an individual or to every trader on the floor. This network is important since noise level directly affects the work done by the trader, who must listen and record many bits of information via the telephone. The messages can also be recalled if a trader missed it when it first was called up.

The two systems and front ends, which include a CCI channel adapter and multiplexer, are valued at $600,000, according to Donnelly. Besides the Meta 4 minis and front ends, the system includes a card reader, disk drives, paper tape unit and magnetic tape.

The two Meta 4s share a Kennedy magnetic tape controller; the disk drives can be switched between the two computers. Both computers are fully redundant and are used as backup to each other, Donnelly said, adding the batch card reader system has been kept as a further backup system.

The system stores 130 data files for use by a trader at any time.

The data is copied continually; every half hour all the data is printed so it can be stored off-site. The trading information is taken off-site daily and software is also kept off-site.

System Handles Egg-Trading Job

(Continued from Page 47)

confirmation that lists the details of the agreement — names of buyer and seller, type and quantity of eggs, shipping route and delivery date. Finally, the system prints a bill to the buyer and a check for the seller.

A summary of each day's trading is also compiled. Applied Systems Inc., who wrote the software, arranged a telephone link with Pennwire, a commodity trader's wire service.

Data to Clearinghouse

Every 10 minutes, the clearinghouse mini dials into this link and sends a summary, and updated information becomes available to traders all over the country.

The clearinghouse system is built around a Digital Equipment Corp. PDP-8/A minicomputer running under Educomp's Etos time-sharing operating system. The installation has 32K of core memory and uses two RKO-5 disk drives. A Decwriter and four Decscopes complete the equipment.

Delano felt the move to the system was inevitable. "I knew we couldn't continue to expand," he said.

"When there are many price adjustments to bids and offers being made, it's hard to keep track of which two come together first. We would probably have to start taking a trading recess to work through the information without the computer."

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Mini, Microfilm Simplify Court File System

LAS VEGAS — Filing the thousands of civil and criminal cases that enter a court information system is one thing; but interfiling and cross-indexing to the original document and the thousands of addending papers is quite another.

At the Clark County Courthouse, an ICL, Inc. 1543 (formerly Singer Business Machines' System 10) with two tape drives, three disk drives and one printer — in conjunction with an Eastman Kodak KOM 80 computer output microfilmer and Miracode microfilm retrieval units — has assisted in providing an answer, according to Don Richards, microfilm systems manager.

New case documents and supplemental papers are microfilmed immediately after filing. The processed microfilm is used to provide an updated master file of case papers, an archival file and a keying or data entry medium for creation of an expanded case history index. Key entry is performed on ICL 1501 intelligent terminals or 4301 key-to-tape units.

The case number as well as all plaintiff and defendant names and other pertinent information associated with the case, is provided to the 1543 system.

Direct access to this file is provided by the intelligent terminals. This allows entry of court dates for trials and hearings as well as direct access to the same information for checking case load and providing court timing control, Richards noted.

Tape from the mini containing the information from this same data base is updated to quarterly segments on microfilm. The microfilm is directly accessible by name key to any record of the data base. This method provides for continual clearing of history from the system and continual creation of an archival expanded index to the cases on microfilm.

By the use of both minicomputer and microfilm disciplines, the office provided a total system that is for all practical purposes infinitely expandable as well as well as directly accessible, he contended. As many as 90,000 records can be recorded for storage in a single microfilm magazine. This equates to an approximate average of 30,000 civil or 45,000 criminal expanded case index 120-byte logical records.

The system reportedly allowed the elimination of the last of the costly handwritten red leather bound volumes found in American court clerk offices since the beginning. This last surviving vestige of the old days is the judgment docket. The record of judgment is now entered via the 1502 terminal and used to clear, by date, active cases and to record the judgment. The resulting time savings was six man-hours per day, according to Richards.

The mini is also used to process information regarding fees collected. All transactions are recorded on Singer 925 transaction recorder magnetic tape cassettes to collect the required information including the case number. These tapes are read into the mini to create an output tape for use by the court as well as the county DP center for fiscal control, he explained.

Various case statistics are generated from the data. An additional file created on the mini is the marriage license application file. This includes all applications issued in Clark County, Nevada. Applications are keyed on key-to-tape units, processed on the mini and output to the KOM 80. The resulting microfilm record is taken to Kodak Miracode retrieval units for 10-second location of any license by either person's last name.

The Clark County Courthouse purchased the Singer system because service was very important, and Singer had service depots to take care of established customers here, Richards noted. When Singer went out of business "it was wild for a while," but now that ICL has taken over, service has improved again, he said.

Interdata Minis Get Controller

ANAHEIM, Calif. — Western Peripherals, Inc., has another single-board magnetic tape controller for Interdata minicomputers.

The TC-140 features total software compatibility with existing Interdata operating systems, the company claimed.

The TC-140 is a plug-in, single-board, dual-density controller with all interface and formatting electronics for both PE and NRZ, the firm said.

Up to four drives can be handled by the unit in any combination of seven-track NRZ, nine-track NRZ, nine-track PE, or nine-track PE/NRZ at any two speeds in the range of 12.5- to 125 in./sec.

The unit also features an extended command register and an enhanced status register.

Available as a complete subsystem (designated TS-140) or as a separate controller, it is provided with tape drives, repeatedly fully integrated and tested as a system using an Interdata computer.

The TS-140 costs $3,100 from the company at 1100 Claudina Place, Anaheim, Calif. 92805.

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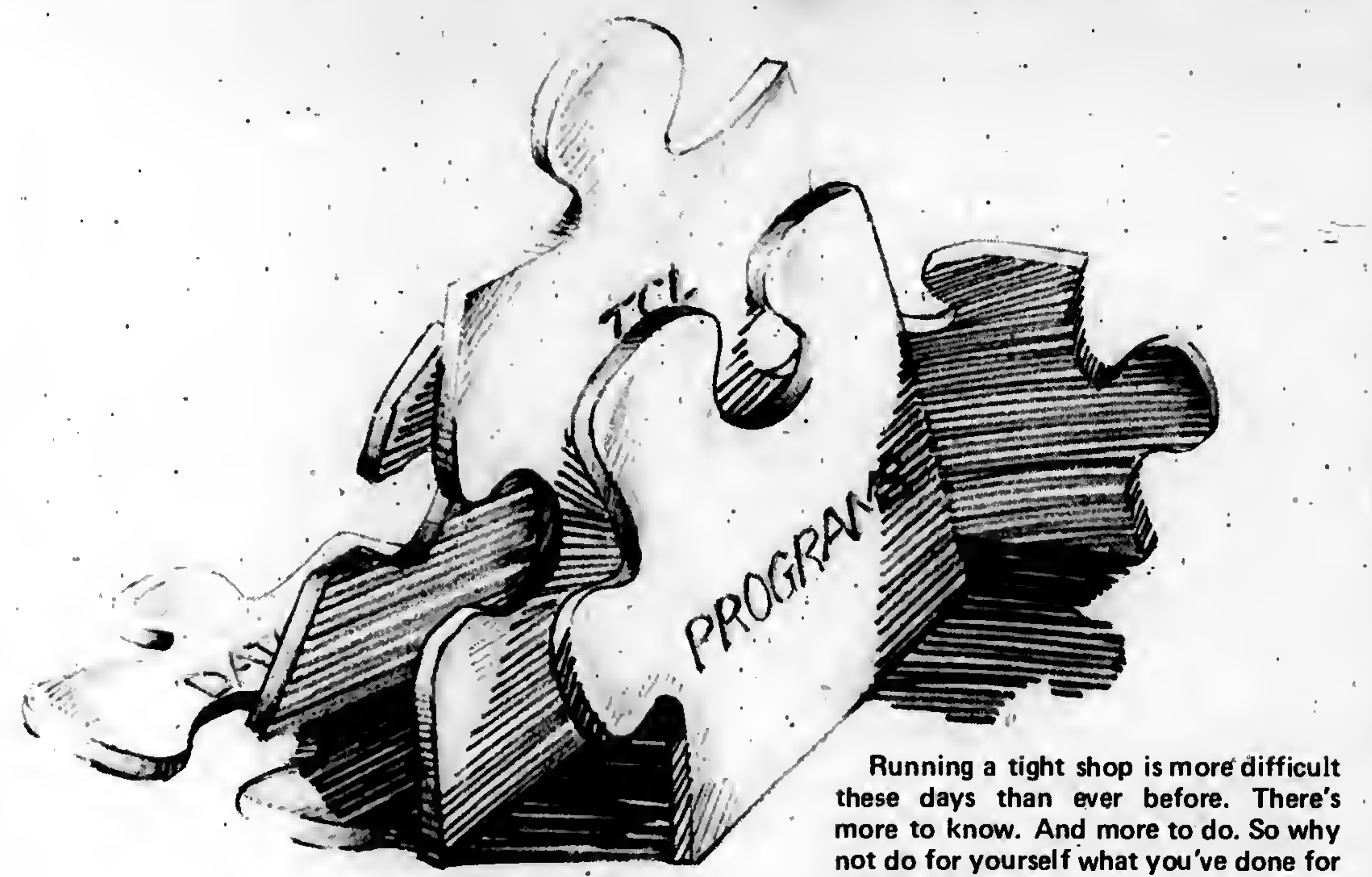

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DEC Has Lab Peripheral Controller for PDP-11

MAYNARD, Mass. — Development of what Digital Equipment Corp. claims is "the fastest commercially available microprocessor-based laboratory peripheral controller" designed for the firm's PDP-11 minis has been announced by that firm.

The LPA11-K controller uses Fortran calls and is said to transfer analog data at an aggregate rate of up to 150,000 sample/sec.

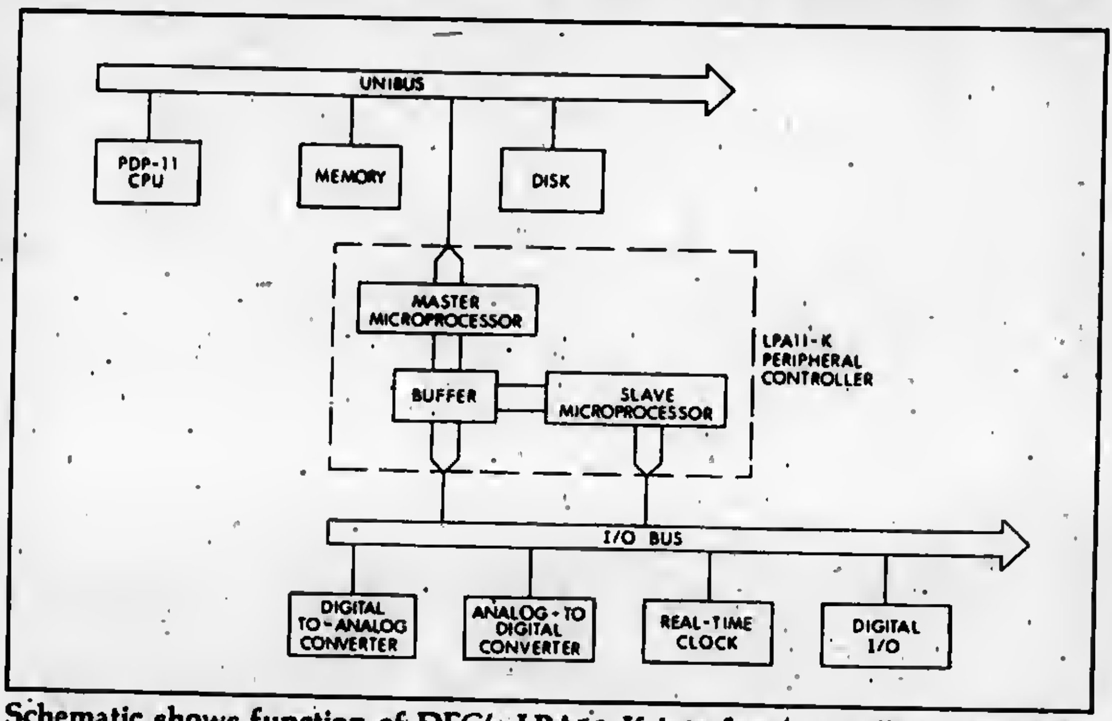
80% Reduction

The transfer rates are achieved by the controller's use of direct memory access, which results in a 60% to 80% reduction in CPU overhead rates as compared with previous techniques, the company said.

Operating under the RSX-11M operating system on all PDP-11 minis with Unibus I/O, the unit features two modes of operation. In single-user mode, higher speeds are achieved while in multiuser mode up to eight users can control experiments or processes simultaneously,. a spokesman said.

The system incorporates two microprocessors to control data and command transfers between laboratory-oriented peripherals and the PDP-11 CPU.

The LPA11-K costs $4,985 from the firm in Maynard, Mass. 01754.



Schematic shows function of DEC's LPA11-K interface/controller. It links the standard PDP-11 Unibus to a separate instrument interface I/O bus through the use of microcomputer technology.

Expansion Memory Made To Fit DG Nova Minis

ENGLEWOOD, Colo. — A nonvolatile add-in expansion memory designed to fit Data General Corp. Nova minicomputers is offered by Monolithic Systems Corp.

Adaptable to the Nova 800, 820, 830, 840, 1200, 1210 and 1220 systems, the MSC 3401 memory is expandable in 4K increments to 32K words. It is "totally" hardware and software compatible with the mini, the vendor claimed.

Featuring an access time of 240 nsec and an 800-nsec cycle time, the memory includes on-board rechargeable batteries that provide four hours of data retention under power loss conditions in the 32K-word configuration, the firm said.

The unit is available 30 days from receipt of order and costs $2,695 for a 32K by 16-bit configuration in single-unit quantities. Quantity discounts are available, a spokesman said from the company at 14 Inverness Drive East, Englewood, Colo. 80110.

Mass Storage Device Suits Syfa System Data Bases

IRVINE, Calif. — A 300M-byte mass storage device designed to meet the large-scale data base requirements of the vendor's Syfa systems has been announced by Computer Automation, Inc.

Designated the DSK-300, the device offers 220M bytes of user-accessible storage and employs Control Data Corp. 9883-91 removable disk packs. Up to eight DSK-300 devices can be linked to a Syfa system, extending total user-accessible storage to 1,760 M bytes.

Larger Capacity Files

The company also said it will make available a new version of its Syfa Concurrent Logic Operating System (Syclops) to permit the storage of larger-capacity individual files. Previously, the largest file allowed by Syclops with currently offered 10M-byte and 80M-byte capacity disk drives was 32,000 sectors or 8M bytes.

The recently announced Syclops provides for individual file capacities up to 900,000 sectors of 230M bytes. The larger file capacities are applicable to the new 300M-byte drives as well as the existing 80M-byte drives, the firm said.

Compatible With Syfa

The DSK-300 is compatible in format and hardware with all existing Syfa systems, according to a spokesman, and no software changes are required if users wish to upgrade their present configurations from existing 10M-byte and 80M-byte mass storage devices. Computer Automation, however, will continue to offer and support both smaller disk drives to Syfa customers, the firm added.

The DSK-300 is contained in a standalone cabinet. Price is $32,500 with 120-day delivery. Computer Automation is at 18651 Von Karman, Irvine, Calif. 92713.

Tri-Data Disk System Bows

MOUNTAIN VIEW, Calif. — Tri-Data Corp. has introduced the Flexifile 21, a microprocessor-controlled flexible mini disk system.

The Flexifile 21 is designed for DP and communications applications including program loading, data logging and on-line data collection.

The system is user-programmable and controlled via its front panel. Eight indicator lamps and six mode select switches are featured and a standard Text Edit software package is included with the unit. A file management system will be optionally offered, the firm said.

Equipped with the RS-232 and/or current loop interface, the Flexifile 21 can accommodate a terminal and modem simultaneously at independent transmission rates. The user can prepare his data off-line and then batch process it to a CPU at a high transfer rate, reducing costly line time, the firm continued.

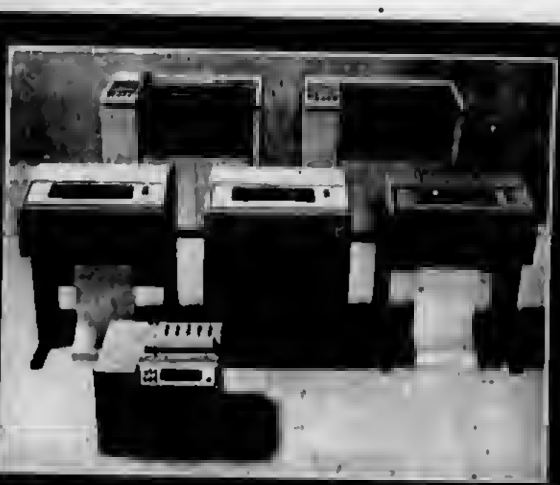
The Flexifile 21 is available as a desktop unit or in a rack-mounted configuration. Utilizing a Shugart mini-floppy drive, the unit also contains an Intel 8080 microprocessor, built-in controller, electronics and power supply and costs $1,995. Tridata is at 800 Maude Ave., Mountain View, Calif. 94043.

Vendor Refurbishes Tape

SHELTON, Conn. — Magnetic Information Systems has announced a refurbishing policy for magnetic cassettes unfit for use because of damage, wear or other reasons.

After purchasing cassettes from Magnetic Information Systems, a user can send a used cassette to the vendor for rework, a spokesman said.

For $2.50 each for a minimum quantity of 25 pieces, the vendor will replace the magnetic tape, change pressure pads if necessary and recertify and repackage the cassette, the company said from 415 Howe Ave., Shelton, Conn. 06484.



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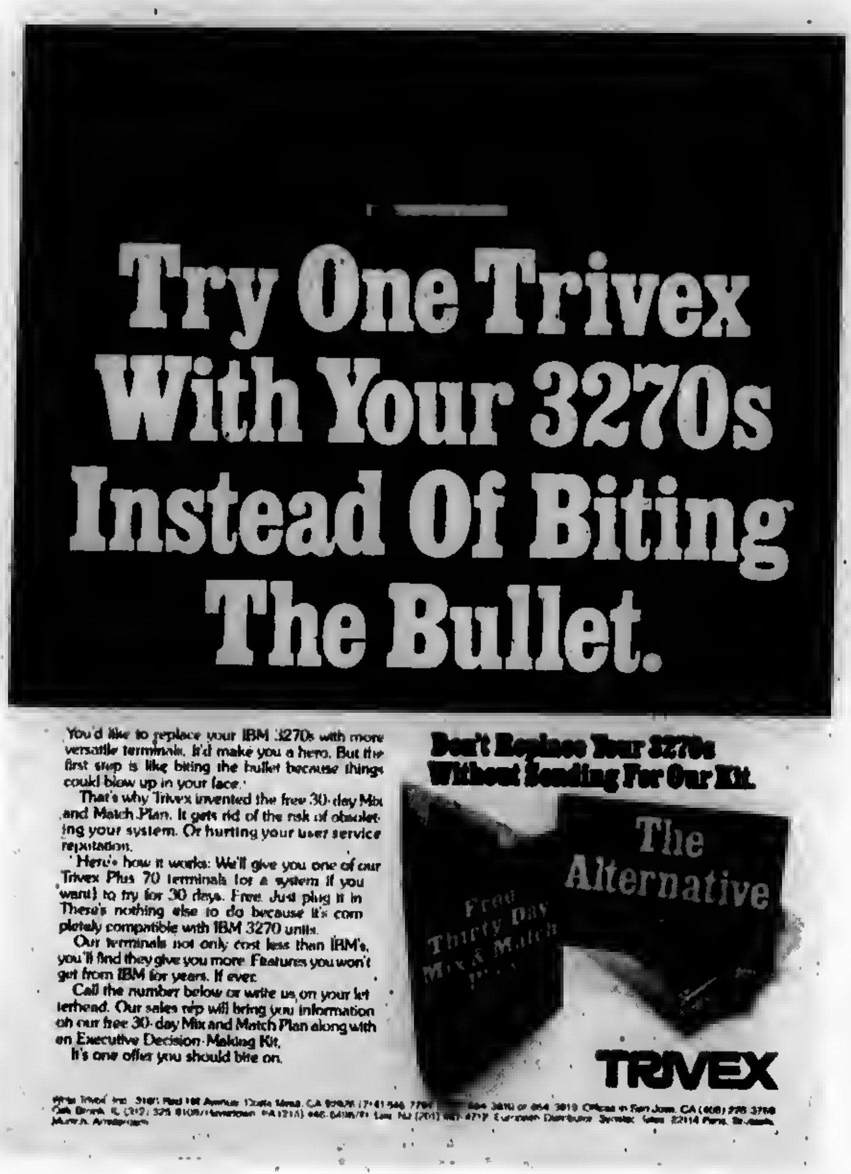

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Everyone That Bit On Our 3270 Offer Is Now A Customer. Why?

Are You Covered?

By Frank Vaughan
CW Staff

Fire . . . Flood . . . Wind . . .

No one likes to think about disasters, but the hobbyist with privately owned computing equipment in his home should be asking some serious questions about the insurability of that equipment.

Under most homeowner policies, microcomputers are covered as contents, according to Ted Kwash, a superintendent in the Personal Insurance Department of Aetna Life and Casualty Insurance Co. in Hartford, Conn. However, Kwash noted in a recent interview, that is not a hard and fast rule because insurance laws differ from state to state as well as from company to company.

Insurance is not just limited to homeowners, he noted. Persons who own condominiums or who rent their residences, can generally buy "contents coverage" which will include their computers.

Kwash urged all home computer owners to check with their insurance agent or company to find out exactly what coverage they have.

Even if the hobbyist finds his home system is covered, the next concern should be what disasters the insurance covers. Most policies have "specified perils" which cover the hobby system either in or away from the home.

There is an "all risk" category in homeowner policies, but fewer than 2% of all policies have this coverage, Kwash pointed out.

A third concern should be how the system is to be valued in the event of a loss. Generally the insurance adjuster has a range within which he can work to determine the value. One method is to compare the product to a comparable commercial product's wholesale cost.

In the event of a kit, coverage is generally limited to twice the cost of the material.

Microcomputers, like all personal property, depreciate in value, Kwash warned. Policies pay on the "actual cash value" of the system; this means that if a three-year-old system is destroyed, the reim-

(Continued on Page 57)

Faced With Three Options

User Picks Micro System Based on Z-80

William L. Colsher
Special to CW

There are a large number of different brands of personal computers available today, and the number is growing every month. The process of choosing a system from this vast array can be a difficult one.

When I first decided to buy a computer system for personal use, there were only a few choices open. This has changed somewhat recently, but the choices which existed then still affect people in a position similar to the one in which I found myself at that time.

Since, like most people, my budget was rather limited, I certainly couldn't buy a commercial system. Even the least expensive minicomputer was far beyond by price range.

I briefly considered buying a used Digital Equipment Corp. PDP-8, but the price of DEC's memory and peripherals eliminated that choice rather quickly.

The advertisements in magazines like *Popular Electronics* and *Byte* gave me what seemed to be three alternatives. The most common type of system was based on the bus structure of the first of the widely available personal computer systems, the Mits Altair 8800. The advertisements and magazine articles made them look pretty good, so I sent away for the catalogs.

The second major choice was a Southwest Technical Products Corp. (SWTPC) 6800-based system. This system was considerably cheaper and seemed to give a lot more for a lower price, so I sent for that information packet as well.

The final choice was a system based on the then-new Z80 microprocessor chip. The system was somewhat cheaper than a comparable Altair-type system, but a lot more expensive than the SWTPC 6800. Digital Group, the company that made the system, didn't supply a cabinet or power supply at the time, but neither of those items are particularly expensive or difficult to make.

When all the information came, I began to compare the systems. The major drawback of the Altair-type systems was that only a tiny amount of memory (256 bytes) was supplied and the front panel was a very costly and unnecessary frill.

Magazine articles are still being published that give instructions on improving the inadequate power supply that came with that type of system (*Kilobaud*, August 1977). One Altair-type system came with a super power supply (the Imsai 8080), but it was much too expensive.

In addition, the bus structure was designed for the 8080 processor and it would have been extremely difficult to efficiently interface more advanced chips to it. For example, a recent 16-bit processor requires two circuit boards for the interface circuitry.

The SWTPC 6800 system was very inexpensive and also supplied 2K of memory and an I/O interface for only $395. This company also had a fairly good reputation for other kits and super prices on software — for example, $14.95 for Basic compared with $150 from Mits.

Just in Time

The Digital Group system information came last, just about the time I was going to send my money to SWTPC. The front panel was nicely bare and all the I/O I could possibly use was supplied — four parallel input ports and four output ports, a TV monitor display interface and a cassette tape interface.

Best of all was the fact that 2K of memory was supplied and an additional 8K was only $200; a total of $675 plus a little more for a

(Continued on Page 57)

Workshop Set for This Week On Interfacing, Programming

BLACKSBURG, Va. — A three-day workshop that will present the basic techniques of microcomputer interfacing and programming will take place at the Donaldson Brown Center for Continuing Education here beginning Dec. 8.

The course will cover the basics of a microprocessing unit (MPU), an introduction to microcomputer programming, I/O functions, chip compatibility, subroutines and interrupts and register transfer devices.

Because the workshop is a hands-on laboratory course, participants will have access to a breadboarding microcomputer station that is based upon the 8080A and 8085 chips and associated support chips such as the 8255 programmable peripheral interface chip, the 8251 universal receiver/transmitter chip and the 8212 8-bit I/O port chip, according to a spokesman.

A variety of complex programmable chips will also be discussed to provide an awareness of future trends. Among them will be the 8253 programmable interval timer, the 8259 interrupt controller and the 8275 CRT controller.

The course was designed for those individuals who are just starting to interface microcomputer hardware. Programming in the workshop will be performed using machine code so each individual can write the I/O driver routines necessary to operate the hardware.

A two-day digital electronics workshop will precede the conference on Dec. 6 - 7 for those individuals with little or no digital electronics experience, the spokesman noted.

The registration fee for the microcomputer interfacing course is $195. The digital electronics workshop costs $145.

Additional information about both courses can be obtained from the Donaldson Brown Center for Continuing Education at the Virginia Polytechnical Institute and State University, Blacksburg, Va. 24061.

Heurikon Board Fits Intel SBC

MADISON, Wis. — A microcomputer board that is bus-compatible with Intel Corp.'s single-board computers (SBC) and has a multiprocessor capability was announced by Heurikon Corp.

The MLZ-80 features 4K of random-access memory (RAM) and up to 8K of read-only memory (ROM). It also has an on-card floppy disk interface for standard or mini-floppy drives, a spokesman said.

The unit has dual serial asynchronous/-synchronous ports with separate software-controllable transmission rates from 50 bit/-sec to 19.2 kbit/sec; RS-232C or current-loop interfaces; four 8-bit parallel ports (two of which have bidirectional capability); direct memory access logic for I/O and memory data transfers or searches; four counter/timers; a selectable power-on jump logic starting address; and full Z-80 vectored interrupt support, the firm claimed.

In its maximum configuration, only three power supplies are required: +5V, +12V and -12V, the spokesman noted.

Pricing of the boards begins at $350 and depends upon configuration and quantities. System development, including hardware interfaces and application software, is also available from Heurikon at 700 W. Badger Road, Madison, Wis. 53713.

C

CABLE, TWISTED-PAIR — A cable formed by twisting together two thin conductors which are each separately insulated. This arrangement can reduce their intercapacitance.

CAGES, CARD FRAME — The basic cage recesses the card frame and is equipped with wings for 19-in. rack mounting. The system cage adds a hinged front door panel for mounting controls and indicators. Some instrument cages are designed with extended depth to accommodate a middle component chassis allowing special components to be mounted within the standard chassis.

CAPACITOR STORAGE — 1. A device which stores a digital bit or an analog voltage by charging a capacitor. 2. A storage device that utilizes the capacitance properties of materials to store data.

CARD — 1. A machine-processable information storage medium of special quality paper stock, generally 7-3/8 by 3-1/4 inches, but other standards exist for other types. 2. An internal pluggable unit for printed circuits wiring and components.

CARD CODE — Refers to an arbitrary code in which punched holes have assigned numeric or alphabetic values.

CARD COLUMN — 1. A line of punch positions parallel to the Y datum line of a punch card. 2. A single line of punch positions parallel to the short edge of a 3-1/4- by 7-3/8-in. punched card.

CARD GUIDES AND EDGE CONNECTORS — Some companies offer steel cadmium-plated card guides with ABS plastic insulated and properly sized for microcomputer modules. They are typically provided with standard slot spacing of 1 inch (25.40 mm). Optional spacing of 1/2 inch (12.70 mm) and 3/4 inch (19.05 mm) are available on special order. A 22/24 (pair/contacts) edge type connector with gold contacts and necessary polarizing keys are gnerally provided with mounting brackets and screws.

CATASTROPIC FAILURE — A failure which is total or nearly so, such as breakdown of the power supply, making all circuits inoperative. Any type of failure which renders the useful performance of the computer to zero.

CATHODE RAY TUBE — 1. A tube which has an electron beam which can be focused to a small cross-section on a luminescent screen and can be varied in position and intensity to produce a visible pattern. Abbreviated CRT. 2. An electronic vacuum tube containing a screen on which information may be stored by means of a multigrid modulated beam of electrons from the thermionic emitter storage effected by means of charged or uncharged spots. 3. A storage tube. 4. An oscilloscope tube. 5. A picture tube.

LEARNER'S LEXICON

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User Goes With Z-80 Micro

(Continued from Page 55)

power supply would put me in business.

It took about two months to get all the boards in. Because I was a rank beginner at kit building and a friend was doing most of the actual soldering and such, however, spreading out the project helped keep things under control.

Compared with a Heathkit, the instructions were incredibly poor, but since the construction consisted only of soldering sockets into printed circuit boards along with a few discrete components, the detail of Heath-type instructions really wasn't needed.

The components were all of excellent quality and in the one case where a part was missing, a phone call to Digital Group had the part in my mailbox in less than a week. One exceptional feature of the system was the fact that sockets were supplied for every integrated circuit, even ones where the socket cost more than the components.

Other systems, such as the SWTPC 6800 require that you either buy your own sockets or solder ICs directly to the boards.

In all cases, the boards checked out the first time with not a single faulty component.

The Digital Group tape system is a considerable improvement over the other common systems for a number of reasons; it is one of the best features of the system.

One of its major technical improvements is that the two frequencies it uses to record data are not harmonics of each other. This tends to increase the reliability of the system.

The most important difference for the user is that the system runs about four times as fast as the other most common tape system. The Digital Group system records and plays at about 1,000 bits/sec or about 125 bytes/sec. The Tarbell/KC standard type of interface, on the other hand, operates at only about 30 byte/sec.

The Digital system is also quite reliable. All the problems I have had could be traced to inferior tapes or bad adjustment of the interface itself. This adjustment is rather critical and for this reason Digital Group recently brought out a new design that does not require any adjustment.

At the time I bought my system, none of the companies had very good software. Digital Group has, however, recently taken a commanding lead. It now has a digital cassette operating system that is quite complete.

A very complete Business Basic is available which was written by Microworks of Cincinnati, the computer store where I bought my system. Digital is also supplying a new type of programming language called Converse, a threaded language.

Would I buy the same system today? Maybe. It remains the most powerful system on the market, with the possible exception of the Heathkit LSI-11, in my opinion.

Colsher is a full-time writer and part-time microcomputing consultant in Hoffman Estates, Ill. The opinions in this article are his own.

Monolithic Board Works With Intel SBC-80

ENGLEWOOD, Colo. — A single-board computer with 8K bytes of static random-access memory (RAM) and 8K bytes of erasable programmable read-only memory (Eprom) that is said to be compatible with the Intel Corp. SBC-80 Multibus system was announced by Monolithic Systems Corp.

The MSC 8001 was designed around the Z-80 microprocessor unit (MPU) with up to 4 MHz clock speed, the firm said. Using the Z-80, this unit provides 158 instructions which include the 78 instructions of the 8080A MPU and provide indexed, bit and relative addressing modes.

Protective Ports

Two parallel I/O ports consisting of peripheral interface circuits with buffers and terminators protect all of the internal metallic oxide circuitry, a spokesman claimed.

A total of 48 lines are available and can be configured for either positive or negative true logic signals, he added.

Real-time processing is provided with an interval timer that contains three 16-bit counters which operate independently. One is reportedly dedicated to the serial I/O port and the other two are available for general use.

Interrupts Provided

The MSC 8001 provides eight levels of fully vectored priority interrupts; there are also other interrupt modes for SBC-80/10 compatibility, the vendor noted.

Memory is available with either 4K or 8K of standard 18-pin, 4K by 1K static RAM. The Eprom and RAM address structure, defined by programmable read-only memory, eliminates the need for jumpers and switches, Monolithic said.

The MSC 8001 supports serial I/O devices with programmable communications rates that are compatible with RS-232C, TTL or current-loop interfaces, according to a spokesman for the firm.

With all interface elements, the MSC 8001 is priced at $845. Monolithic is at 14 Inverness Drive East, Englewood, Colo. 80110.

Most Home Micros Covered

(Continued from Page 55)

bursement, less the deductible, will probably not pay for the replacement of an identical system.

There is, however, an option for the hobbyist who wishes to provide better coverage for his system. A hobby system can be placed on a "schedule," according to Kwash.

Placing a micro on a schedule will generally help the hobbyist because the value of the system is predetermined and agreed upon by both parties. Generally the insurance company calls for a third-party estimate of the value, Kwash said.

This gives the hobbyist the best chance to recover the maximum amount should a loss occur. With some exceptions, placing the micro on a schedule provides an added benefit because items which are insured in this manner are covered for all losses with no deductible.

Placing software on such a schedule is probably the best way to insure it, Kwash indicated. Otherwise, it may be difficult to prove its value over and above the cost of the cassette, paper tape or diskette.

As a final point, Kwash noted that a micro would probably be excluded from coverage if it was the cause of the loss.

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Cassette Operating System Offered

NEWTON, Mass. — A cassette operating system that will run on most 8080 and Z-80 microprocessor units and is distributed on Tarbell, Digital Group and TDL standard tapes was announced by Algorithmics, Inc.

The Zaps system consists of a full Z-80 assembler, text editor, in-memory file system, labeled cassette tape storage system with full cyclic redundancy checks on all tape operations and a variety of other software utilities, the firm said. It is resident in 14K of memory, which includes all buffers and 1K byte of symbol table space.

No line numbers are required on the text editor as only the actual data bytes are stored. Editor commands include input, insert, delete, replace, change, global change, up, down, top, bottom, string search, print and print current line number, a spokesman claimed.

The assembler processes the Zilog recommended form of mnemonics. A variety of pseudo operands is available including origin, end, define byte, define word, define string and equate. The Zaps system also features English error messages and the ability to accept numerical values in hex, octal, decimal or binary form, it was reported.

The system, including a 90-page users manual and examples of how to modify the system for a variety of microprocessor I/O devices, is priced at $60 from Algorithmics, Inc., Box 56, Newton Upper Falls, Mass. 02164.

RAM Unit Nonvolatile

LAFAYETTE, Ind. — Microprocessor memory expansion with nonvolatile memory is reportedly possible with a module introduced by the Wintek Corp.

The Wince CMOS random-access memory (RAM) battery module utilizes two size AA nickel cadmium batteries to retain memory during power off conditions, even when the module is unplugged from the system bus, the firm said. The batteries reportedly last up to one year.

The module can accommodate up to 2K bytes in multiples of 256 and has write protection. The unit is available on standard 4-1/2 in. by 6-1/2 in. 44-pin printed circuit boards for $399 from the Wintek Corp., 902 N. 9th St., Lafayette, Inc. 47904.

Intel Adds RAM Boards

SANTA CLARA, Calif. — Intel Corp. has extended the amount of memory available for its SBC 80 line of single-board computers in announcing three random-access memory (RAM) expansion boards.

The boards store 32K, 48K and 64K bytes of data and are respectively called the SBC 032, 048 and 064.

Each board stores data in 16K-byte blocks, using individual Intel RAMs, in contrast to previously available boards that stored 16K bytes each.

Storage dedicated to one CPU or shared by several is accommodated by the directly interfaced system bus structure, Multibus, containing read and write buffers.

Block addressing is jumper-selectable with the intent of optimizing use of computer-resident and expansion memory capacities.

The boards are marketed at single-unit prices of $1,650 for the SBC 032, $2,300 for the SBC 048 and $2,950 for the SBC 064, with OEM discounts for quantities of 10 or more units.

Intel Corp. is located at 3065 Bowers Ave., Santa Clara, Calif. 95051.

IOR Introduces Video Unit

DALLAS — A video system containing all the address decoding necessary for both memory-mapped and isolated I/O on a 5-in. by 10-in. printed circuit board was announced by IOR.

Video output of the board is either XYZ-transistor-transistor-logic compatible or composite video. The display consists of 1,920 characters organized as 30 lines of 64 characters plus a 128-char. non displayable buffer, the firm said.

With each I/O instruction, the cursor is reportedly automatically updated, thus eliminating the necessity of cursor movement in the program, a spokesman claimed. There is 2K bytes of memory on board with under 500 nsec of read/write time, he added. A screen of data can be completely changed in under 800 microsec.

Price of the VSD2K kit is $399 from IOR, Box 28823, Dallas, Texas 75228.

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Micro Drives Get Controller

LOS ANGELES — Wangco, Inc. is offering a micro-controller for use with 5-1/4-in. diskette drives in 6080- and 8080-based microcomputers, minicomputers and other byte-oriented systems.

The 8201 micro-controller is pin-compatible with the standard S-100 bus. A single printed wire board reportedly plugs directly into the S-100 connector. A principal component of the unit is an Intel MCS 8048 microprocessor, which facilitates a nine-macro-command structure and provides 1K-byte of read-only memory (ROM).

Formatting performed by the 8201 is reportedly of a soft-sectored, modified IBM type with 16 sector/track and 128 byte/sector. The unit provides for a 128-byte sector buffer or multiple sector transfer without buffering, a spokesman said.

Features of the 8201 incude a diagnostic command for self-test operations and a duplicate function which automatically copies diskette information from one drive to another at one command from the host, the firm added.

The unit, which will control up to four drives, sells for $490 from Wangco, Inc., 5404 Jandy Place, Los Angeles, Calif. 90066.

Unit Compatible With SBC 80

ENGLEWOOD, Colo. — Monolithic Systems Corp. has brought out the MSC 8001 single-board computer, which reportedly is compatible with the Intel SBC 80 single-board computer and built around the Zilog Z-80 microprocessor.

The MSC 8001 features 8K words of random-access memory (RAM) and 8K words of erasable programmable read-only memory (Eprom) with serial and parallel I/O ports.

The Z-80 processor is used to provide 158 instructions, including 78 instructions of the MSC 8080A computer, and to provide indexed, bit and relative addressing modes.

Real-time processing is accommodated by the 8253 interval timer, which contains three independently operating 16-bit counters. Eight levels of fully vectored priority interrupts are featured, according to the firm.

The MSC 8001 single-board computer is priced at $845 including all interface elements and 8K words of RAM from Monolithic at 14 Inverness Drive East, Englewood, Colo. 80110.

Pro-Log Offers 1977/78 Catalog

MONTEREY, Calif. — Pro-Log Corp. has published its 1977/78 price list and catalog illustrated with product photographs and selection charts.

The 48-page publication is a guide to the firm's line of programmable read-only memory (Prom) programmers, microprocessor systems, analyzers, support hardware and design courses and seminars. The catalog also introduces new Pro-Log products and lists some price reductions.

Sections on 8-bit and 4-bit microprocessor systems include data on 8080A, 8085, 6800, Z-80, 8008, 4004 and 4040 products including starter sets, testers and support hardware.

The catalog is available free from the Pro-Log Corp., 2411 Garden Road, Monterey, Calif. 93940.

Plastic Enclosures For Computer Builder

BRIDGEWATER, N.J. — Three high-impact plastic enclosures designed for the computer builder were introduced by Enclosure Dynamics, Inc.

The VTE 101 terminal enclosure, KBE 101 keyboard enclosure and TVT 101 typewriter enclosure are flame-retardant and easily machinable using ordinary woodworking tools, the firm claimed. They reportedly feature molded ventilation grills, a removable keyboard plate, and ribs and bosses for component mounting.

The terminal enclosure is priced at $69.95 unpainted and $79.95 painted; the keyboard at $19.95 and $25.95; and the typewriter at $39.95 and $48.95 from Enclosure Dynamics, Inc., P.O. Box 6276, Bridgewater, N.J. 08807.

Power Supplies Bow

NEWTON, Mass. — A series of AC/DC power supplies that deliver +12 or +15 VDC at 60, 100, 200 or 300 mA has been introduced by Intronics, Inc.

The eight Series EPM units reportedly feature stable references, low-phase shift and broadband regulator circuits to achieve low drift and offset. The standard output tolerance is about 2%, the firm said.

The units are stable even with large values of capacitance across their outputs and they permit buffering against severe load transients, it said. All thermal factors are controlled and low thermal masses and thermal gradients allow for a minimum delay in reaching equilibrium, a spokesman said.

The series costs from $29 for 60mA models to $65 for 300 mA units, Intronics said from 57 Chapel St., Newton, Mass. 02158.

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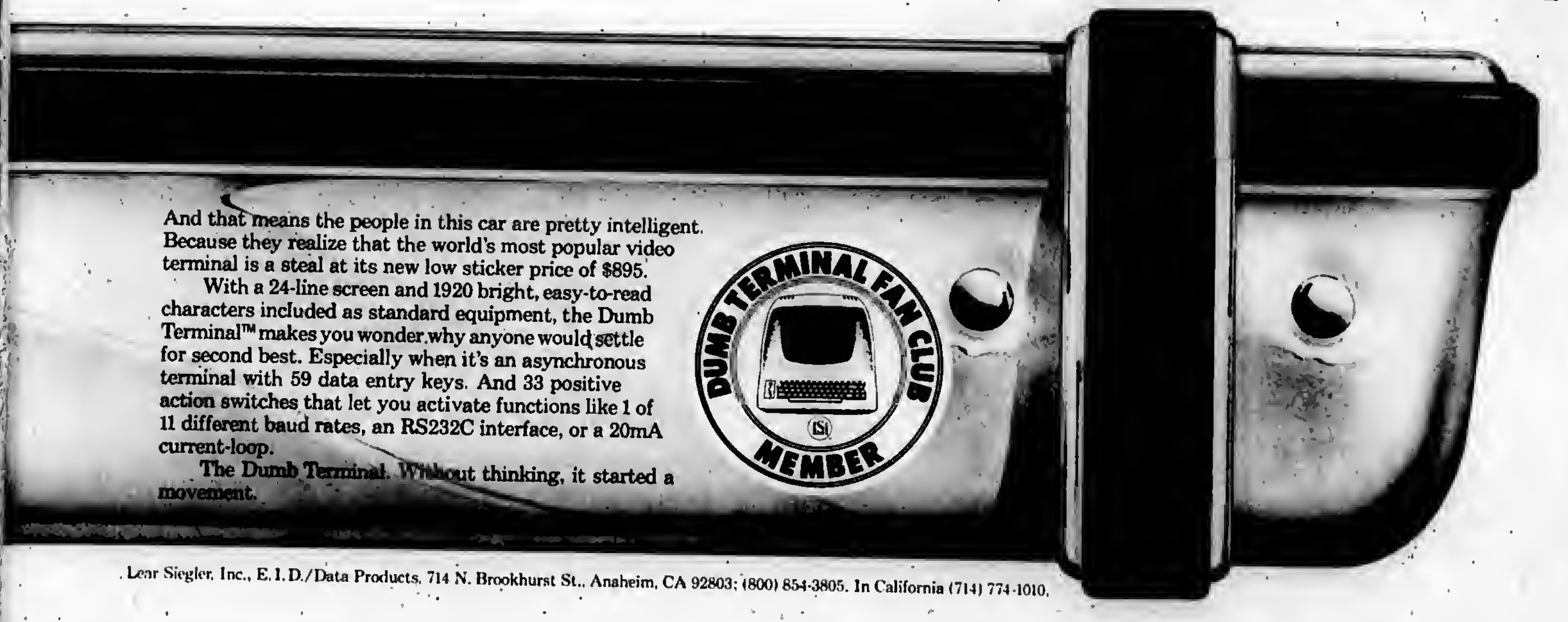

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On Small Business Scene
Vendors Seldom Alone at Client Site

By Molly Upton
CW Staff

Small business system vendors usually meet three or four other competitors at a prospective user's site, according to a CW survey of those vendors.

Very seldom does the user call only one vendor, they acknowledged, and the number of vendors under consideration can go as high as 10, although generally the user narrows the field to three or four serious contendors, they said.

Geography in large part can determine who competes, several indicated.

And mainframers with small system offerings face the same competitive situations as do the small system vendors except when the user already has some of that vendor's gear, according to the survey.

Few said they see much competition from the systems houses, firms that buy hardware on an OEM basis and provide software.

When the user has been referred by a friend or business acquaintance, the vendor is apt to have the stage all to himself, respondents indicated.

But even then, the user is likely to have done some sort of price analysis, according to Art Garofalo, vice-president of sales at Minicomputer Systems, Inc.

One reason there are not more vendors generally involved is that the small businessman doing the purchasing cannot afford the time to look at more, according to Carl Jeremias, vice-president of marketing at Basic/Four Corp.

The user probably looks initially at several more and then narrows the field to the three vendors he calls in, he continued.

Geography Significant

Nearly all respondents mentioned the significance of geography when discussing the type of competition they see in the field.

Both Terry Marsh, vice-president of sales for Qantel Corp., and Doug Russo, Univac's director of marketing support for business systems marketing (the BC-7), said the small systems vendors are apt to be more prolific in the major metropolitan areas than in the less densely populated areas. Jack Shevillo, director of general products and systems for Burroughs Corp., concurred.

Marsh explained that it takes several years for the smaller firms to field the network and support staff necessary to cover all areas. But in large cities where users have the choice between the smaller, "technological" companies and the mainframers, the mainframers are either not considered or are eliminated quickly, Marsh said.

Shevillo added that Burroughs is apt to see mostly other mainframers in the more remote areas.

The number of competitors depends "on the industry and the locality, Jeremias commented. If a firm's base is small and the salesman is working from a cold lead, then the vendor is likely to encounter at least two or three others, he said.

Basic/Four has a large number of installations in the Los Angeles area, so the number of referrals it gets is extremely high, Jeremias said. In referrals, Basic/Four is often the only system considered, he added.

Basic/Four also tends to be the only firm called by users in particular vertical industries, such as country club management, where the firm has established a reputation, he said.

Although the respondents generally indicated the mainframe vendor is often one of multiple bidders, John Cunningham, senior vice-president of field operations for Wang Laboratories, Inc., remarked that for every situation in which Wang is a bidder, there are 10 "we don't know about."

These often involve a mainframer the company has been with before for other equipment, he said.

Marsh said Qantel is seeing Univac in the field more than it has previously.

Russo indicated that since Univac has announced its BC-7, it is frequently one of the three or four firms called by a small user.

(Continued on Page 66)

IBM Settlement in ADR Suit Aimed to Avoid 'Giant' Image

By Catherine Arnst
CW Staff

NEW YORK — IBM may have settled out of court with a software firm that sued it on antitrust charges in 1970 in order to avoid the image of "a little company versus a giant," according to an IBM document used as evidence by the government in the U.S. vs. IBM antitrust trial.

The document, dated July 8, 1970, listed several alternatives to the Applied Data Research, Inc. (ADR) Lawsuit, including the suggestion to "settle so as to avoid further hearings." The case was settled in August 1970.

Hilary Faw, IBM's assistant treasurer, wrote the document, which was recently placed in the U.S. vs. IBM trial record after a long fight by IBM to keep it and other corporate papers out of evidence on the basis of attorney-client privilege.

At the time the Faw memo was written, IBM was facing law suits from ADR, two other software houses, Control Data Corp. and the Department of Justice (DOJ). All these plaintiffs charged IBM with bundling software and services with the price of the CPU in order to exclude competition and maintain a monopoly position in the market.

Faw suggested that once the ADR suit was settled, "all future programming systems will be separately priced and made available optionally with the hardware." With this action, IBM would move "conflicts with outsiders" away from the bundling to the area of discriminatory pricing. "Such arguments will be very difficult to wage and very difficult to prove one way or the other," Faw wrote.

The disadvantage of settling, however, would be that "to the world, we would appear to be acknowledging that systems programming is in fact separable from the hardware," he said.

Another alternative listed in the document was for IBM to buy out ADR and all other software houses "with whom eventually we will be in conflict." Faw's basic objection to this plan was its "open-ended nature."

The advantage of the plan was "[it] would clearly buy us some time," Faw said. "It also offers us the flexibility of buying off the first several and selecting a later one of which to make a stand in court."

IBM could also "establish a new dividing line between the programming systems and program products" to stave off the ADR suit, Faw suggested, but saw little gain in such a move. "There is apparently no level of programming systems effort which could not be improved upon by outside specialists. I think the basic question with this option is the uncertainty of what it would buy us," he said.

As a final and unpleasant alternative, IBM could "fully price on a cost basis all programming systems not yet in the public domain including separate prices for all segments of each system." This was clearly incompatible with IBM's marketing strategy at that time, and was mentioned "merely to remind us that we were to [go to court] and lose our case, this could be forced upon us," Faw warned.

ADR acquired one of the other software firms that sued IBM, Programmatics, Inc., and the two were the first of the firms suing IBM antitrust claims. ADR received $1.4 million from IBM in the out-of-court settlement in exchange for some "limited" overseas marketing rights to its "Autoflow" software package.

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Bankrupt Key-to-Disk Maker CCI Rebounds

By Jeffry Beeler
CW Staff

TORONTO — Six years after declaring bankruptcy and going into government receivership, Consolidated Computer, Inc. (CCI) is finally back on its feet again and operating as a financially independent organization.

Last year, the key-to-disk equipment manufacturer earned $20,000 on revenues of $10 million, and this year profits will total $300,000 to $500,000 on sales of about $20 million, the firm's marketing vice-president, Peter Baines, predicted.

To be sure, these figures are still small by IBM or Digital Equipment Corp. standards. To CCI insiders, however, their symbolic importance is immense because they signal an abrupt, and possibly permanent, upturn in the company's previously declining financial fortunes.

Before the turning point in fiscal 1976, the financially beleaguered firm had not enjoyed a profitable year since 1970, Baines said.

But even more important, the figures mark an end to the massive transfusions of federal and provincial capital that kept the company alive during its years of grave financial uncertainty.

Too Much Too Soon

CCI's fiscal history provides a painful object lesson in the dangers of unrestrained corporate growth. The company entered the computer business in 1969 with the introduction of one of the industry's first key-to-disk systems.

At first, the company's prospects for market survival appeared good. User response to its products proved enthusiastic, and equipment sales soon surpassed $40 million, Baines said.

But even as orders mounted, CCI entered what Baines called a "superexpansive mode" in which it opened more marketing fronts than it could support. The trend began with the establishment of marketing and field service operations in the U.S. and Canada, continued with the creation of English and German subsidiaries and culminated with a $30 million OEM contract with International Computers Ltd. in the U.K.

At the same time, the company attempted a stock offering in the U.S., but business conditions proved unfavorable.

As the expenses from these diverse enterprises continued to outpace the company's revenues, CCI executives found they could no longer count on their traditional sources of equity.

To a certain extent, Baines blamed the financial woes that followed on peculiarities in the Candian banking system. "Canadian banks are somewhat more conservative, less willing to take risks than their American counterparts," the marketing vice-president explained.

At any rate, with its financial backers increasingly unwilling to provide support, CCI finally went into receivership in the fall of 1971, only two years after its founding.

Government Help

A week later, the Canadian government reacted to save the foundering firm. First, it guaranteed a lease-financing loan from Ford Motor Credit, then took over CCI's lease base and sold it back to the company in exchange for debentures.

The Canadian and Ontario governments then granted the company a $60 million revolving line of credit and, with the debt settled, became 60% owners of CCI stock.

By March 1972, the firm had emerged from receivership, having sold its English and German subsidiaries but with its North American customer base still intact.

Today, the Canadian and Ontario governments still own about 60% of CCI's stock, with the federal government accounting for about 48% and the provincial government accounting for the remaining 12%. As the firm's financial position strengthens, however, the two governments plan to gradually cut their ownership share to 25%, Baines said.

To prevent a recurrence of CCI's past financial difficulties, company executives have deemphasized their commitment to the OEM market and channeled most of their corporate resources into the end-user business, Baines explained. This year, OEM sales will constitute only about $2.5 million of CCI's total revenues, with the remaining $17.5 million going into the end-user sector, he said.

They also have instituted a policy of steady, controlled growth that contrasts sharply with the company's pre-receivership days of "boom town" expansion. During the next three fiscal years, CCI plans to boost its sales methodically to $26 million, $34 million and $40 million, respectively, according to Baines.

In a further move to avoid past mistakes, company executives have narrowed their scope of business interests to include just one subject — data entry. "We want to concentrate on the thing we know best," Baines explained.

Building on this existing base, they then plan to expand gradually into related DP areas like distributed processing, he added.

CCI's entry into the distributed processing market will begin in 1978 with the introduction of the Series 2 Key-Edit system, Les Sellmeyer, company president, said in a prepared announcement earlier this year.

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Vice President of Marketing
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digital

Diablo 1641 Printer Terminal

Diablo Printer Terminal Aimed at IBM 2741 Mart

HAYWARD, Calif. — Diablo Systems, Inc. unveiled the 1641 printer terminal aimed at the IBM 2741 market.

The unit is basically an upgraded 1620 and features switch-selectable Ebcdic/Ascii code; plotter capabilities, automatic diagnostic and test features and forms handling features, according to the firm.

The optional Hyplot software package permits plotting in increments of 1/120 in. in a horizontal direction and 1/48-in. increments in a vertical path.

Densities can reach 5,760 point/sq-in., the firm said. A basic graphics capability is available as a standard feature.

The 1641 keyboard send/receive terminal uses the daisy print mechanism that prints at 45 char./sec in 10- or 12-pitch char. and operates on lines up to 1,200 bit/sec. It includes a microprocessor controller and several levels of program and data storage, the firm indicated.

The terminal may also be used in APL terminal specifications, Diablo indicated.

The 1641 costs $2,480 in quantity from Diablo at 545 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Card Interfaces Floppy to LSI-11

SANTA CLARA, Calif. — Data Systems Design, Inc.'s card for interfacing the firm's. DSD 210 floppy disk system to Digital Equipment Corp.'s LSI-11 eliminates the need for the DEC card, thus saving one bus slot, the firm said.

The card, DSD 210-L11A, includes hardware bootstrap, dynamic-memory refresh logic and bus termination circuitry and costs $319 each; quantity discounts are available.

The firm is at 3130 Coronado Drive, Santa Clara, Calif. 95051.

Transport Suits 3M Cartridge

PLAINVIEW, N.Y. — A tape transport for the 3M Co.'s Model DC100A miniature data cartridge is available from North Atlantic's Qantex Division here.

The transport, which measures 3 in. by 4 in. by 4-1/8 in. with cartridge in place, is designed to permit one controller to daisy chain four minidrives, the firm said.

The drive price including head electronics but no controller is $250 in single quantity from the Qantex Division at 200 Terminal Drive, Plainview, N.Y. 11803.

Contracts

National Sharedata Corp. has received a $15 million, five-year facilities management contract from the Security Bank & Trust Co. of Southgate, Mich.

Aspen Systems Corp., a subsidiary of American Can Co., has been awarded a one-year, $2 million federal management contract by the National Criminal Justice Reference Service.

MSI Data Corp. has received a $1.6 million contract from a group of wholesale druggists, McPike, Inc., for MSI/77 solid-state, hand-held data entry terminals.

Computer Sciences Corp. has received a $3 million contract from the U.S. Air Force to provide systems engineering services to the Armament Development and Test Center at Eglin Air Force Base, Fla.

Interfaces, Digitizer Bow

SOUTHPORT, Conn. — Science Accessories Corp. is offering a digitizer system utilizing a Texas Instruments SR-52 calculator as well as a line of input interface packages for use with the TI SR-52 and SR-59 terminals.

The SAC GP-352 costs $2,850 and consists of the firm's basic Graf/-Pen Model GP-3 sonic digitizer, a TI SR-52 and the necessary interface, cabling and plug-in connector.

As stand-alone interface packages, the firm offers interface cabling, plug-in connector, calculator modification and power supply for $750.

The firm is at 970 Kings Highway West, Southport, Conn. 06490.

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Better Educated User Seen Factor in Distribution Push

NEW YORK — A better educated user is one of the primary factors influencing the transition from the era of data processing to the era of data management, Robert E. Weissman, president of National CSS, Inc., told financial analysts recently.

As a consequence of the new breed of DP manager, who is comfortable with computers, users are trending toward the development of distributive processing, he said.

The services industry, with its traditional customer orientation, should benefit from the trend toward data management, distributive processing and other services that rely heavily on minicomputers, he observed.

Weissman predicted the services industry "will become the largest single customer group for minis as our industry provides the vehicles by which minis are installed, programmed and operated at the user level."

Other Factors

Other factors influencing changes in addition to the better educated user are:

- A user community that "seeks results, not romance," from computers.
- The user's demand to reduce costs.
- The end of the not-invented-here syndrome.

"They are the younger managers in business and government. These users are products of the computer age. They were trained in the use of computers both academically and pragmatically in their business administration, engineering and even liberal arts courses. For them, computers are a basic tool, a part of their experience," he said at the meeting held by the Association of Data Processing Services Organizations (Adapso).

"Make no mistake about it, both data management and the move toward distributive processing have found their champions in this new breed of managers," he added.

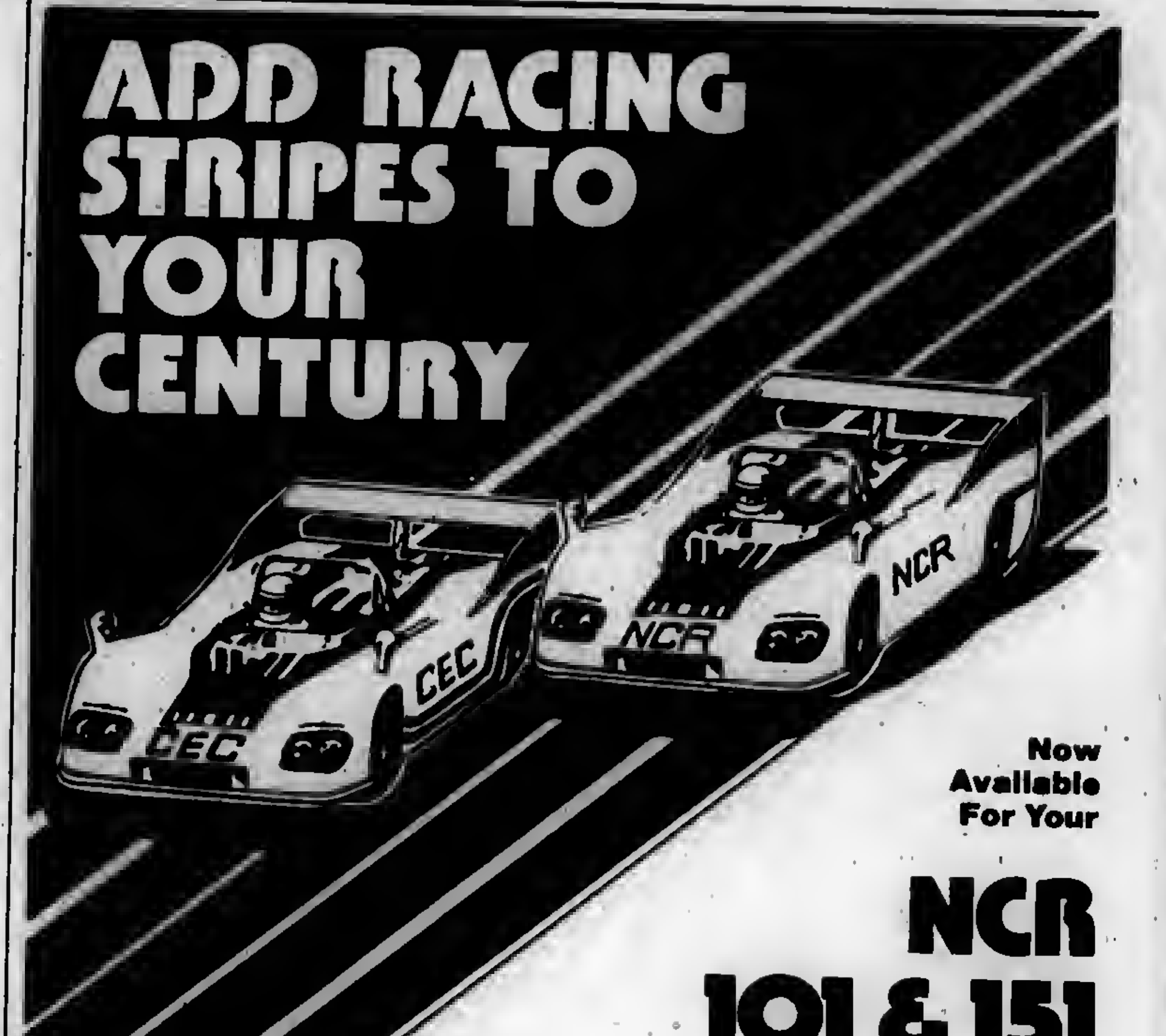
The user rebellion is producing other changes throughout the computer industry. Users are demanding most of the changes in which computer and computer systems function and "they are leading the way toward the development of distributive processing, microminis and firmware," he said.

Wilson Follows Cross As ICL Director

LONDON — ICL Ltd. has a new managing director, Christopher M. Wilson, following the resignation of Geoffrey R. Cross.

Cross, a U.S. citizen, joined ICL in 1972 and reportedly is interested in moving to a warm, dry climate in order to promote the health of his young children. He will remain a director of the firm until the end of the year.

Wilson has been the director of the firm's International Division since 1972.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But Impact Uncertain

Datapoint Expects Arc to Open New Markets

NEWTON, Mass. — Datapoint Corp.'s attached resource computer (Arc) will probably open up new markets for the firm, according to Ed Gistaro, vice-president of marketing.

But as with any new concept, it's hard to guess where the impact will be, he added.

The Arc system permits a number of processors, including IBM mainframes, to access a common data base (See story on Page 1).

Initially, Datapoint plans to concentrate on its current user base, which is primarily the Fortune 1300, although 35% of its base is with small businesses, he added.

The whole concept is predicated on what has been Datapoint's strong point over the years, fully compatible operating systems and file structures for various products, he added.

The compatible file structure give Datapoint its real marketing edge — the ability to go to a customer and solve a problem rather than sell a particular product, he indicated.

"We were lucky enough to have a product development group with vision," he added.

And the big payoff of the compatibility of software and peripherals probably has yet to be realized, he said.

When Datapoint was investigating designing a big machine, it came across the concept for the Arc system, Gistaro said.

However, the Arc does not obviate the firm's intention to bring out a big machine, he indicated.

It's not Datapoint's intention to get into the mainframe business per se, he added. The Arc will supplement large machines whether made by Datapoint or others, he said.

"Whatever we bring out will not be a master network controller but rather either a big file processor or an applications processor," Gistaro stated.

Currently the largest disk offered by Datapoint is 200M bytes, but Gistaro indicated there are plans for larger disks which will be supplied by its Amcomp unit.

Although Datapoint breaks down its software revenues for internal purposes, Gistaro declined to give a figure. He did say that the firm charges for software mainly for protection rather than to make money.

Datapoint bundles the price of the new operating system for the Arc in with the equipment but has separate charges when acquired by itself. He indicated that establishing prices was difficult because there was nothing against which to gauge it.

Vendors Clash For Small Users

(Continued from Page 61)

For the most part, Univac sees competition, he said, and is rarely called in alone.

But Burrough's situation is somewhat different because it has a user base of L series accounting systems. The loyalty from this base is "very high," Shevillo said, especially since Burroughs offers those with a three-cassette system the capability to transfer their applications to the B80.

And the B80 is upward-compatible with the B800 and the B1800, he said.

Some Burroughs users call in other firms as well, but generally they look at Burroughs first, he said.

Shevillo didn't know what percentage of sales leads for the B80 comes from Burroughs users.

When dealing with nonusers, Burroughs generally sees other mainframers such as IBM, NCR and Digital Equipment Corp. in the remote areas and smaller firms where they have representation, he said.

Russo and the others indicated they rarely see systems houses. Generally the small user is looking for a bit more security, Russo commented.

CPA's Role

Several vendors mentioned the role of the certified public accountant (CPA) in assisting a user in his selection. Although there was some disagreement, generally the vendors said there are not too many first-time users who call in a CPA.

But those who have the CPA help them issue their request for quotations probably waste less time looking at vendors with unsuitable products since the CPA or consultant forces them to decide on system requirements, Garafalo suggested.

"Without a CPA, the user probably looks at more vendors because he is likely to be less structured in his thinking," he added.

Cunningham said less than 10% of the users retain consultants or CPAs and send out request for quotations. Users often don't seek a CPA's help until late in the decision-making cycle.

Marsh said although the first-time user often will bring in his accountant, and sometimes a consultant, most of the time he does the selection himself.

Because a CPA may more readily recommend a system with which he is familiar, several of the small firms are courting the CPA market with packaged systems. Wang has such an offering and Qantel is developing an accounting package.

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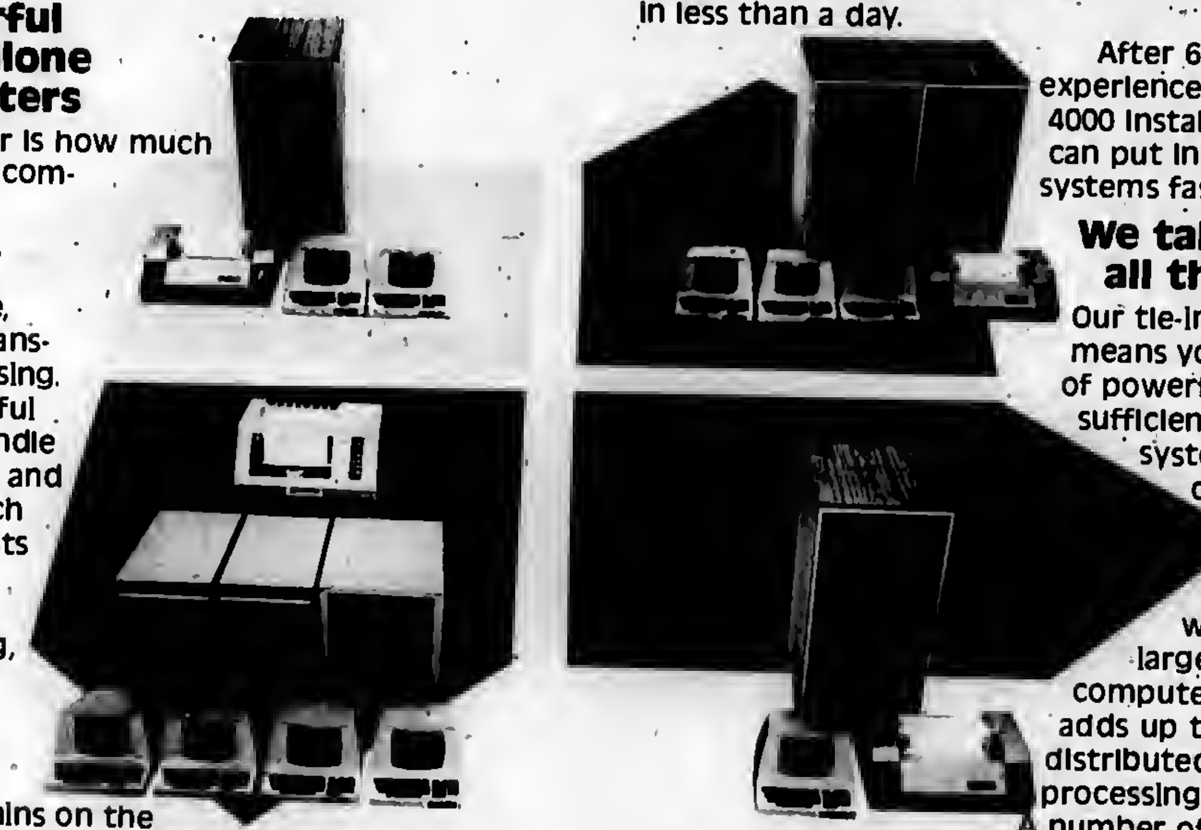

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IBM Considered Blind Study on Leasing in '68

By Molly Upton
CW Staff

NEW YORK — IBM schemed how to have a blind study performed on the strengths and weaknesses of the leasing industry, according to documents introduced in the U.S. vs. IBM antitrust suit.

The document expressed concern about the revenues IBM could count on from lessors in the future and concluded that many of the hypotheses under which the firm had been planning might be incorrect.

The document was apparently written in 1968, since it addressed the time frame of 1969-75. In it, IBM asked innumerable questions pertaining to the viability of the leasing market and also how to have the study done with minimum exposure.

IBM was very concerned that word would leak out about the study and that the public would infer that the knowledge would be used to harm the leasing companies, according to the document.

The report would also conjure up the image of David and Goliath and possibly lead to involvement by Ralph Nader, which could lead to legislative sanctions, IBM indicated.

IBM Trial Documents

"Changes in public opinion can influence direction [and] scope of Department of Justice activities with respect to IBM. Questions themselves can stimulate leasing companies to take actions they might not have considered," the report observed.

IBM indicated it doubted the validity of many hypotheses about the leasing industry. These included the hypotheses that leasing companies were not viable business entities on a long-range basis and that sophisticated business-people would not involve themselves in the leasing company industry.

The report concluded that "there will be a 'return to normalcy' (1964 vintage) in the lease/purchase mix and purchase levels will turn down in 1969 and remain at manageable levels for the foreseeable future."

The questions ranged over the categories of financial, computer market related, policies, terms and conditions and legal aspects.

Among the legal questions was: "Do the leasing companies believe that the Department of Justice views them as an essential part of the computer industry and, thereby, would take action to prevent their demise?"

Executive Corner

- Thomas B. Towers has been appointed vice-president of marketing operations at Courier Terminal Systems.
- Donald J. Bracken has been elected treasurer of Modular Computer Systems, Inc. E. Lee Saylor and George D. O'Leary were named vice-presidents.
- Martin Lippman has been promoted to the position of general manager of Prime Computer's Scandinavian subsidiary, Prime Computer Scandinavia AB.
- John Stanioff has been appointed vice-president of Storage Technology Corp.'s International Division.
- Loren Eltiste has been appointed vice-president of finance at Persci, Inc.
- Charles E. Wyman has been selected vice-president of marketing by SYS/3 Associates, Inc.
- Robert Gilchrist has joined General Automation, Inc. as vice-president, worldwide customer and applications engineering.
- George B. Sublett has been appointed vice-president, treasurer and secretary of Tri-Data Corp.
- Joe Keith has merged his own firm, Custom Engineering, Inc., with Southern Systems, Inc. (SSI) and has been named vice-president of engineering.
- Richard W. Martin has been promoted to vice-president and general manager of the Americas and Asia group for Memorex Corp.
- Joe R. Brooks has been named vice-president/controller of Mohawk Data Sciences Corp.
- Michael Shebanow has been appointed vice-president of engineering for Shugart Associates.
- Harvey Kramer has been promoted to vice-president of corporate marketing at System Automation Corp.
- Jim Adkisson has been appointed national sales manager for Shugart Associates. Don Stark has joined the company as Midwest district sales manager. The company also appointed Bob Sandie as director of material.
- Peter Brennan has been named national sales manager of Computer Automation, Inc.'s Commercial Systems Division.
- Owen E. Tyler has been selected vice-president for National Sharedata Corp.
- Alfred H. Jorgensen was elected president and treasurer of Interactive Sciences Corp.
- James R. Folts has been appointed a vice-president of Perkin-Elmer's Data Systems Group.
- Richard H. Hatton has been named vice-president, field operations, for Tesdata Systems Corp.
- Charles W. Murphy has been appointed vice-president of marketing at Periphonics Corp.
- C.G. Calderaro has been elected chairman of the board and chief executive officer at Remote Computing Corp.
- Seymour R. Cray, chief executive officer of Cray Research, Inc., has been elected chairman of the board. John A. Rollwagen was elected to succeed Cray as president and was elected a director.
- Dean E. Ely has joined Dataproducts Corp. as vice-president for corporate information systems.
- Robert N. Shuhmann has joined MSI Data Corp. as director of North American sales.

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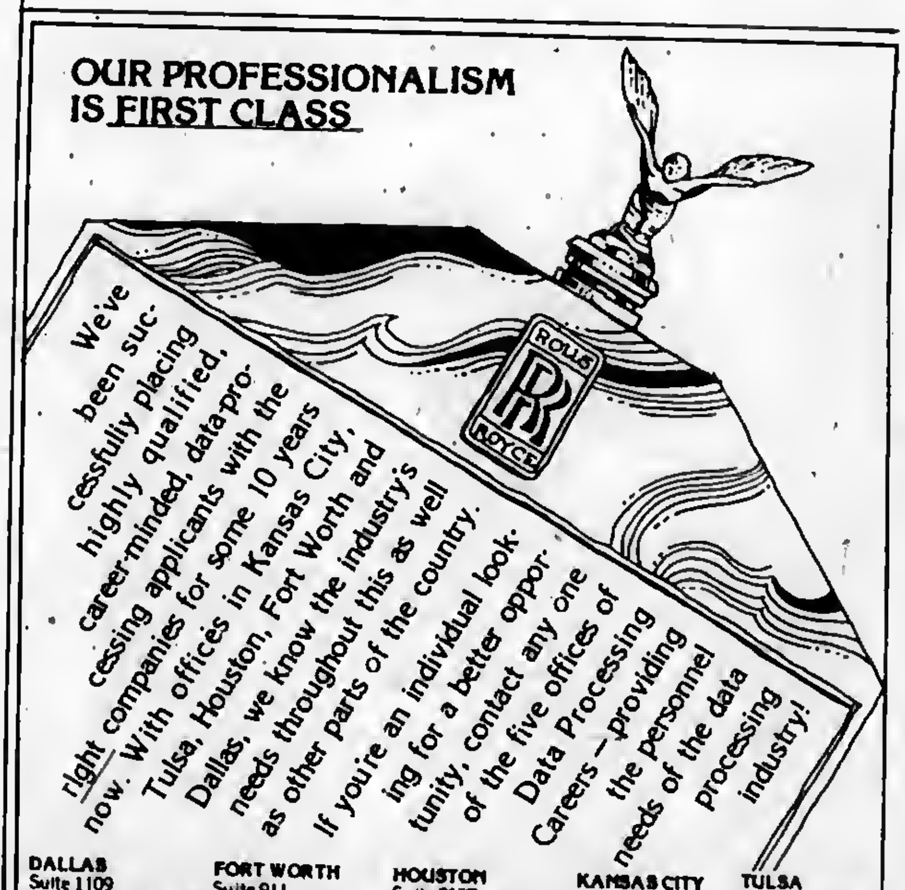

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Earnings Reports

PERTEC COMPUTER
Three Months Ended Sept. 23

	1977	e1979
Shr Ernd	$.26	$.19
Revenue	32,049,000	24,140,000
Earnings	1,599,000	945,000
6 Mo Shr	.50	.32
Revenue	61,205,000	49,974,000
Earnings	3,099,000	1,999,000

e-Restated for pooling-of-interests basis and accounting change.

PLANNING RESEARCH
Three Months Ended Sept. 30

	1977	1979
Shr Ernd	$.19	$.17
Revenue	49,499,000	42,930,000
Earnings	1,237,000	e1,059,000

e-Includes after-tax gain of $157,000 from sale of subsidiary.

PRIME COMPUTER
Three Months Ended Oct. 2

	1977	1979
Shr Ernd	$.38	$.29
Revenue	13,972,000	9,011,000
Tax Cred	.....	351,000
Earnings	1,052,000	879,000
9 Mo Shr	.96	.65
Revenue	34,201,000	14,777,000
Tax Cred	150,000	726,000
Earnings	2,540,000	1,494,000

PROGRAMS AND ANALYSIS
Nine Months Ended Oct. 1

	1977	1976
Shr Ernd	$.12	$.06
Revenue	3,043,450	2,595,039
Earnings	116,099	64,064
3 Mo Shr	.03	.02
Revenue	1,064,756	646,239
Earnings	29,791	16,764

ROCKWELL INTERNATIONAL
Year Ended Sept. 30

	1977 (000s)	1976 (000s)
Shr Ernd	$3.91	$3.24
Revenue	6,959,700	5,195,000
Disc Op	.....	1,600
Earnings	144,100	122,000
3 Mo Shr	1.10	.95
Revenue	1,591,900	1,398,600
Earnings	41,600	39,000

ROLM
Three Months Ended Sept. 30

	1977	1979
Shr Ernd	$.30	$.29
Revenue	9,458,000	5,669,000
Earnings	510,000	403,000

QUOTRON SYSTEMS
Three Months Ended Sept. 30

	1977	1979
Shr Ernd	$.36	$.14
Revenue	9,795,257	5,879,963
Tax Cred	709,825	214,758
Earnings	1,368,045	363,135
9 Mo Shr	.99	.59
Revenue	24,455,350	17,496,690
Tax Cred	1,896,873	946,293
Earnings	3,652,179	1,742,261

SANDERS ASSOCIATES
Three Months Ended Sept. 28

	1977	e1976
Shr Ernd	$.66	$.33
Revenue	28,996,000	33,858,000
Tax Cred	1,469,000	649,000
Disc Op Loss	.....	413,000
Earnings	3,209,000	1,576,000

e-Restated.

STORAGE TECHNOLOGY
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.57	e$.40
Revenue	40,912,000	26,229,000
Earnings	3,099,000	1,978,000
9 Mo Shr	1.44	e1.08
Revenue	111,997,000	99,992,000
Earnings	7,517,000	5,262,000

e-Adjusted for 9% stock dividend paid in May 1977.

SYCOR
Three Months Ended Oct. 2

	1977	1979
Shr Ernd	$.32	$.45
Revenue	19,977,000	17,933,000
Earnings	1,096,000	1,555,000
9 Mo Shr	.92	1.32
Revenue	55,639,000	50,923,000
Earnings	2,127,000	4,336,000

SYSTEM DEVELOPMENT
Three Months Ended Sept. 30

	1977	1979
Shr Ernd	$.33	$.26
Revenue	33,299,000	26,540,000
Earnings	539,000	639,000

T-BAR
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.33	e$.19
Revenue	2,520,000	1,962,000
Earnings	201,000	113,500
9 Mo Shr	.77	e.51
Revenue	9,474,000	4,572,000
Earnings	.77	e.51

e-Adjusted to reflect 7.5% stock dividend paid in April.

TALLY
Three Months Ended Oct. 2

	1977	1979
Shr Ernd	$.34	$.30
Revenue	6,997,000	9,929,000
Tax Cred	299,000	515,000
Earnings	952,000	1,069,000
9 Mo Shr	.94	.77
Revenue	22,934,000	20,199,000
Tax Cred	916,000	1,294,000
Earnings	2,336,000	2,999,000

SYSTEMS ENGINEERING LABS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.31	$.06
Revenue	9,791,00	8,002,000
Tax Cred	420,000	132,000
Earnings	675,000	156,000

TELEX
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.29	$.04
Revenue	37,984,000	22,753,000
Tax Cred	1,552,00	270,000
Earnings	2,621,000	434,000
6 Mo Shr	.41	.16
Revenue	70,012,000	47,355,000
Tax Cred	2,503,000	709,000
Earnings	4,379,000	1,672,000

TEXAS INSTRUMENTS
Three Months Ended Sept. 30

	1977 (000)	1976 (000)
Shr Ernd	$1.29	$1.06
Revenue	516,587	426,139
Earnings	29,534	24,259
9 Mo Shr	3.70	2.97
Revenue	1,471,618	1,197,701
Earnings	94,508	99,115

VERMONT RESEARCH
Year Ended Sept. 30

	1977	1979
Shr Ernd	$.69	$(.73)
Revenue	4,967,401	3,972,903
Earnings	939,341	(525,220)

Contracts

Tandon Magnetics Corp. has signed a $4,500,000 contract with California Computer Products (Calcomp) to supply Calcomp with ferrite recording heads for flexible disk drives.

Raytheon Service Co. of Burlington, Mass., has been selected by the U.S. Army to maintain its IBM 360/40 equipment at Fort Benjamin Harrison, Ind.

Remote Computing Corp.'s contract with the County of Los Angeles has been renewed for one year. The contract calls for an automated investment portfolio management system.

Beehive International has signed a volume purchase agreement in excess of $4 million to supply video display terminals, spares and accessories to the Ohio College Library Center of Columbus, Ohio.

System Development Corp. (SDC) has been awarded a Mission Support contract with a potential value of $22.3 million by the Environmental Proection Agency (EPA) to provide management and operational support for the EPA's National Computer Center at Research Triangle Park in North Carolina.

Digital Equipment Corp. has signed a five-year contract with the State of Tennessee for supply of computer systems for the state's universities and community colleges.

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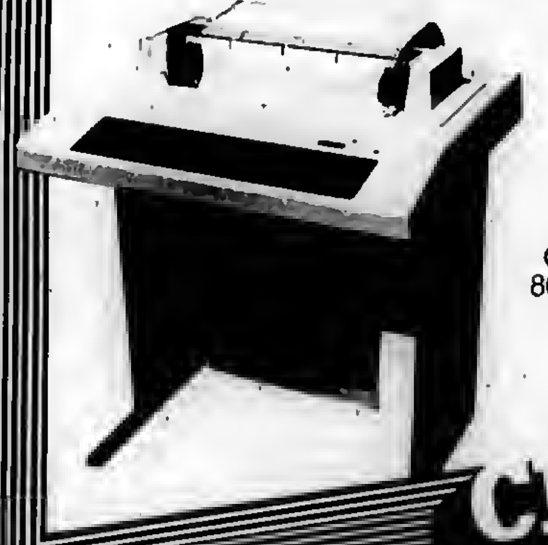

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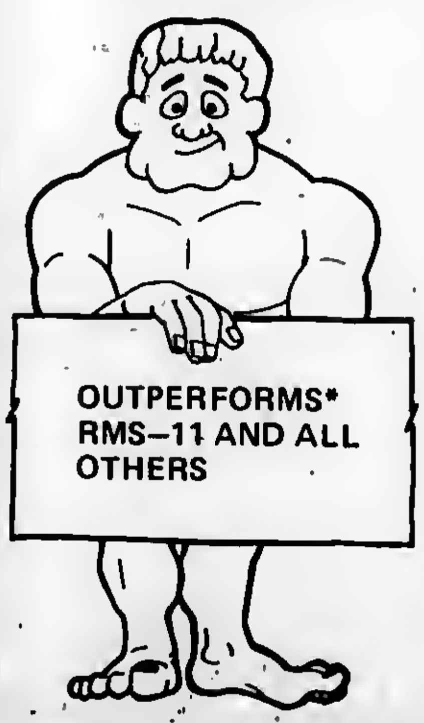

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Growing Annual 15% Through '85

ADL Sees World Communications Booming

WASHINGTON, D.C. — Investments in satellite and message communications systems will grow an average of 15% per year through 1985, experiencing the most rapid growth in the international telecommunications field, according to Arthur D. Little, Inc. (ADL).

Speaking at a recent seminar here, the market researcher's telecommunications experts noted the demand for domestic networks based on satellite service will triple the number of earth station antennas; there were 400 in operation at the end of 1976.

Increases in traffic and terminals will quadruple the annual number of data communications messages in the U.S. from 2.3 billion in 1975 to 9.2 billion in 1985, they added.

At the same time, the basic telephone plant will retain its dominance of the telecommunications market, continue to enjoy the vast majority of investment and grow at a healthy 8% rate, ADL said.

Doubling Demand

The firm predicted the worldwide annual demand for telecommunications equipment will double by 1985, growing from $26.2 billion in 1975 to $58 billion. The North American market will also double in the same time period — growing from $13 billion in 1975 to almost $25 billion in 1985.

However, the ADL telecommunications experts believe the domestic market will shrink significantly as a percentage of the world total, from 50% to 42%. The European market will remain the second largest.

Collectively, markets for telecommunications equipment in the Middle East and other developing countries will grow at an annual rate of more than 10% to become 28% of the world market compared with 22% percent today, they projected.

The ADL team expects the total telecommunications equipment market to continue to be concentrated in switching, transmission, and local distribution equipment. In the aggregate, the markets for this equipment will climb to $25.8 billion in 1985, they said.

The Telephone growth will continue to be concentrated in countries with large-scale networks in place because these countries are far from being saturated — nearly 80% of the world's telephones are concentrated in eight countries, each having more than 10 million telephones installed, they said.

The U.S., with 149 million telephones, has three times as many as any of the other countries — Canada, Japan, the UK, Western Germany, Italy, France and the USSR. By 1980 Europe will outstrip North America in numbers of telephones installed.

Developing Countries' Edge

Both satellite and message communications systems will experience rapid growth in developing countries, according to ADL. At present, the largest number of existing earth stations is in North America, and the U.S. is the overwhelming user of data communications terminals.

Telex service has reached a state of maturity in North America, but not in developing countries, where it is an essential alternative to dial-up telephones for communicating with the outside world as well as within the countries, the experts said.

One advantage which the developing countries have at this stage of technological development in telecommunications is their ability to leapfrog established technologies for those more suitable to their needs, according to John F. Magee, ADL's president.

Noting that telecommunications is actually a prerequisite for social and economic development, he observed that telephone density correlated with per capita gross domestic product has been viewed as a symptom of underdevelopment.

"The symptom has now become ingrained as a cause [of underdevelopment]," he said, adding that a new measure of a lesser developed country's capability for economic development might well be reflected by its telecommunications plans.

Technological Trends

Maximum use of electronics — currently declining in cost-per-function — to offset the rising cost of labor and copper was cited by the ADL team as one important trend in telephone plant technology. They pointed out that this may well be the only way in which the more ambitious plans of some developing countries can be achieved.

They also emphasized the use of computers to hold down the rising cost of administering telephone systems.

The growing importance of digital modulation in long distance transmission was cited by the ADL experts. They believe digital transmission will replace the more traditional use of analog over the next 10 years. The increasing sophistication of microprocessors and other circuits will cause this.

They observed that substantial progress has been made in recent years in improving performance at lower cost of long distance transmission systems. Most prominant among the technologies now being developed are higher-frequency satellite systems.

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Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
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We'll also look at the practical aspects of computer security in this report, with articles like these:

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Dunhill

806 S W Broadway
Portland, Ore. 97205
(503) 224-1850

Texas

Dunhill

11211 Katy Freeway—Suite 430
Houston, Tx 77079
(713) 932-0040

Virginia

Dunhill

7900 West Park Drive
McLeen, Va 22101
(703) 790-5393

Dunhill

7015 Keene Mill Road
Springfield, Va 22150
(703) 569-3410

Wisconsin

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305 E. Walnut Avenue
Green Bay, Wis. 54301
(414) 432-2977

DATA PROCESSING DIRECTOR

Boulder, Colorado

The City of Boulder is seeking a Data Processing Director with seven years experience, which must include: • 3 years in systems analysis • 3 years in COBOL programming • 2 years Burroughs experience

Degree in Computer Science or related field required. Management, Government, and Communications experience desired. Salary range is from $21,150, to $28,150; initial salary based on qualifications.

Send Resume to:
James W. Piper
Assistant City Manager
City of Boulder
P.O. Box 797
Boulder, CO 80306
Application deadline is
December 31, 1977
Equal Opportunity Employer

Telephone Company

MARKETING

Professionals Required

$28-$30,000

True Marketing Positions represent about one for every 20 Sales positions in most companies. This is one of those rare opportunities for a few successful Salesmen to enter the Corporate Headquarters Marketing environment of a major Common Carrier. Eastern location.

Required are a college degree, 5 to 10 years of demonstrable success in selling, a working knowledge of computers as used in communications, an education in marketing skills and a familiarity with Operating Telephone Company offerings. Also desired is expertise in either Voice, Data or Networks.

For Consideration Write:

Tele/Data Recruiters

P.O. Box 73 Mahwah, N.J. 07430

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Waht a way to start off the year ...

- New Career Upgrade Salary Increase
- New Years Eve Party - Las Vegas
- 3 Days on the Las Vegas Strip

Computer Logic will pay for all expenses for a 3-day trip for applicants who obtain a position through our service. We have extensive openings available in the nation's soundest economic and lowest cost-of-living state ... TEXAS. (Houston and Dallas rank 1 and 2 of top 20 cities.) We prefer to adapt your skills to the employment market ... not vice versa.

1. OS COBOL Prog/Anal; group converting to IMS; unique chance for IBM education and OJT in data base upgrade.
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If you want to step up to "STATE OF THE ART" data base systems or advance your career in 1978, call or forward your resume ...

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Personnel Consultants
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Dallas, TX 75234

Trip can be taken at more opportune time and applies to candidates who contact us by February 16, 1978. Air fare, meals, floor show Tropicana Follies Bergere, and gratuities included.

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Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living *and* a good life.

Immediate openings in these areas

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■ SOFTWARE CONFIGURATION MANAGEMENT

Design, develop programs to support software testing, release and repair.

■ SOFTWARE DEVELOPMENT

Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing.

■ SOFTWARE QUALITY CONTROL

■ MICR APPLICATION SOFTWARE

Experience desired in both Transit and Proof of Deposit applications plus features such as CRT Reject-Reentry.

■ COMPUTER ENGINEERING

Design and development of CPU for medium to large general-purpose computer systems. Requires BSEE with 1 to 5 years' experience in logic design using very fast logic circuits. Experience in designing processor, memory or I/O control using ECL logic very desirable.

■ FIRMWARE

Design, code, maintain firmware virtual machines and/or micro utilities in firmware product development. Measure, report firmware product performance, establish performance goals, conduct product performance analysis, develop firmware performance tools. BSCS or equivalent with experience in assembly language, COBOL, micro programming, micro processors and hands-on hardware.

■ TECHNICAL SPECIALIST

Definition and specification of I/O Subsystem Configuration Accessory products. Work with hardware and software design organizations at Corporate levels to define products. EE or CS degree preferred, 8 to 10 years' experience in architecture and logic design of processors, memories, I/O controllers. Knowledge of PROM-controlled micro processor-based designs highly desirable.

■ DEVELOPMENT ENGINEERS

Perform logic design and microcoding of intelligent peripheral controllers which are PROM-controlled and micro processor-based. BSEE or CS degree, 3 to 5 years' experience in digital logic design, ROM coding and use of micro processors.

■ DIAGNOSTICS/TESTWARE

Develop peripheral test programs for fourth generation computer systems. Specify, code, debug, test and document these programs. BSEE with 3 to 4 years' experience, preferably in peripheral diagnostics.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependants, generous relocation allowance.

INTERVIEWS DURING MINI/MICRO COMPUTER CONFERENCE, DEC. 6 & 7

To arrange a confidential interview during the 1977 Mini/micro Computer Conference Dec. 6 and 7 in Anaheim, Calif., please call George Rice at (714) 750-1811 between 9 a.m. and 5 p.m. during the conference. If you are not attending, please send your resume directly to the Professional Placement Department at the address below.

NCR DATA PROCESSING DIVISION
16575 W. Bernardo Drive, San Diego, Calif. 92127
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PROGRAMMER/ ANALYST

A shortly to be installed Data General Eclipse S230 needs an experienced person to guide it through its formative stages and then help develop its full potential.

Heavy application experience on Online Order Entry, Bill Processor Inventory Control, and Requirements Planning are required.

An absolute command of Basic is needed while experience with TAC Basic would be helpful.

Please submit resume and salary requirements to:

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Mainline Data Processing Services company offers opportunity to qualified Programmer/Analyst candidates - wide variety of applications and Hardware - State of the Art Software - professional environment - planned professional growth - competitive salary and benefits plan - positions available in our Baltimore, Buffalo, Chicago, Pittsburgh, Rochester and Syracuse locations. Call (312) 648-1084 or rush resume.

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PROGRAMMER/ ANALYST

Need experienced Programmer/Analyst to fill opening in growing Tyler firm. Experience necessary in some of the following areas: OS, DOS, COBOL, RPGII, ALC, Payroll; General Accounting. Salary Commensurate with experience. Send resume to Data Manager, P.O. Box 2016, Tyler, Texas 75710. Equal Opportunity Employer, M/F.

COMPUTER PRO

If you are a professional and have the "state of the art" data skill, we want to talk to you. The market is right, all we need is you! Below is a sample of some of the positions available.

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Chicago Asst Mgr.	25-28K
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SYSTEMS	
Mfg. Specialist	22-24K
Profit Sharing	20-22K
Receivables to Travel	19-21K
Administrative IMS	22-24K
Consultant	20-22K
PROGRAMMER ANALYST	
RPG II Mod. 15	15-16K
Cobol Honeywell	15-17K
DOS	15-16K
OS Cobol to travel	20-22K
BAL Learn new Applc	16-18K
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BAL Go Systems	15-18K
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Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

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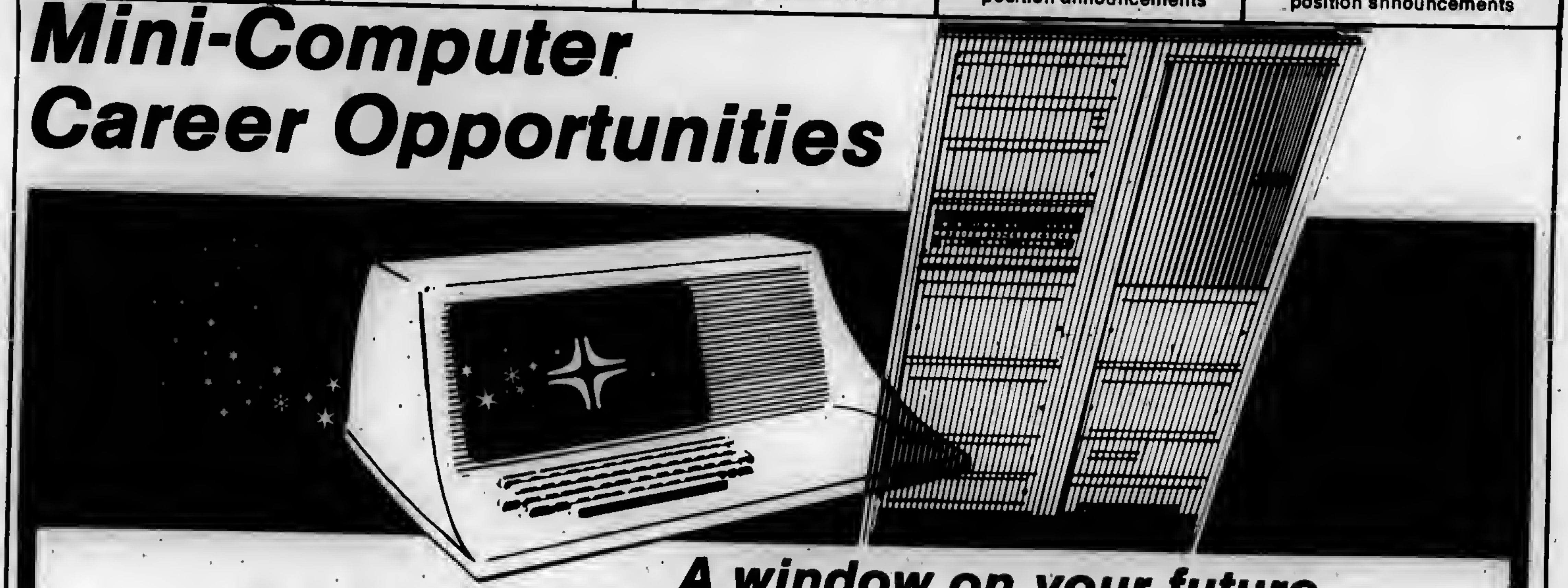
Mini-Computer Career Opportunities



A window on your future...

Sperry Univac, one of the biggest names in big computers has recently become one of the biggest names in small computers with the V-77 Family of high performance mini-computers; a fast, powerful trio that relates to most mainframes. Become part of Sperry Univac's growth to leadership in the mini-computer world! If you are a professional of proven ability and one who desires the best for your career, we invite you to consider the openings below.

See you at the Mini/Micro '77 Conference in Anaheim!

SYSTEMS SOFTWARE DEVELOPMENT

Data Communications Development

- Software design/implementation of asynchronous and synchronous protocols(BSC, SDLC, UDLC, HDLC, U100/200, 3270).
- Transaction Oriented Systems.
- Distributive Communications Architecture.
- Front-End Processor Systems.
- Assembly and Higher Level Languages.
- Project Management potential/experience.

Data Communications Pre-Sales Support & Development

- Evaluate customer data communications software RFQ/RFP's.
- Assist with software proposal preparation.
- Estimate time and cost of data communications software development effort.
- Design creative resolutions for customers data communications needs.
- Provide state-of-the-art data communications technical leadership.

Performance Measurements

- Analytic and simulation modeling.
- Establish procedures and develop necessary tools to perform the system measurements of our on-line transaction oriented system.

Software Sustaining

- Enhancement and support of operating systems.
- Telecommunications systems.
- Fortran Compiler.

Diagnostics

- Development of system level testing and fault-isolation software.
- Member of hardware/software design team involved in mini-computer test systems development.
- Project responsibility for all phases of assembly language and micro-programming language implemented programs.

Special Software Design

- Real-time systems programming.
- Special Interfaces/device drivers.
- Diagnostic hardware/software
- Project control/cost estimates.
- Assembler languages.

High Level Language Development

- Pascal or Algol Programming.
- Data Base Access/Query.
- Fortran Compiler Development.
- Project Management.

Operating Systems Development

- Data Base Management System design and implementation.
- Use of DBMS in distributed environments.
- Development of simulation programs and performance measurement tools.
- On-line teleprocessing.
- Design and development of data communications software for operating systems development.
- Line and network protocols.

Custom Applications Programming

- Industrial automation.
- On-line transaction systems.
- Distributed processing networks.
- Data Base Management Systems.
- Assembly and high level language.
- Proposal writing, design specs, project management.

We offer an excellent salary and a comprehensive benefits package, as well as the opportunity to contribute to the dynamic growth of the mini-computer industry.

We'll see you at the MINI/MICRO '77 Computer Conference and Exhibition in Anaheim, California. Come and talk with our Department Managers. Please call 714/752-0377 or 833-8738(between 8:00AM and 4:00PM) for our conference hotel location.

FIELD OFFICES

Sales Engineers

We offer:

- Best commission plan in the industry.
- Competitive products to sell.
- Highly respected worldwide customer engineering support organization.
- Challenge and real growth opportunities.

Requirements:

- Minimum 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed Processing market place.
- Technical competence in hardware and software.
- Record as a closer.
- Record of maintaining account relationships.
- Ability to obtain new and repeat business.

Field Systems Analysts

Key responsibilities in:

- Marketing headquarters interface.
- Sales/Proposal preparation.
- Defining and solving customer requirements.

Requirements:

- Technical degree desirable.
- Creative problem solver.
- Minimum 2 years pre and/or post sales support.
- Real-time commercial(Data Base, Data Communications, Distributed Processing) and/or real-time scientific applications.

Sales Engineers and Field Systems Analysts positions available in: **Chicago • Dallas • Houston • Detroit • Philadelphia • Boston • Rochester • Buffalo • New York(Manhattan) • New Jersey • Washington,D.C. • Atlanta • Denver • Portland, Oregon • Seattle • St. Louis • Los Angeles • San Francisco**

If you are not able to attend the Conference, please call Al Sack at 714/833-2400 (COLLECT).

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COMPUTER SYSTEMS

MINI-COMPUTER OPERATIONS
2722 Michelson Drive Irvine, California 92713
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software systems programmer

The opportunity to combine
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with the ideal life style
now presents itself

Sambo's Restaurants, Inc., located in beautiful Santa Barbara, California, offers you the opportunity to help make the perfect environment a reality.

Our requirements call for an individual with a minimum of 2 years operating systems programming experience on DEC-10 equipment to maintain systems software; perform diagnostics for system failures; investigate system deficiencies and recommend enhancements; design & code necessary utilities & development tools; and conduct herdware evaluation studies. Dagree preferred but not essential.

Submit your resume including salary history in complete confidence to:

William P. Schultz, Manpower Planning

Sambo's Restaurants, Inc.

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Santa Barbara, Calif. 93105
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Sambo's
RESTAURANTS

DATA PROCESSING

MANAGEMENT CONSULTING PRACTICES

Southeastarn offices of "Big 8" CPA firm (Atlenta, Birmingham, Louisville, Miami, Nashville, Orlando, Tampa.)

We have opportunities for menagement consulting positions in our offices throughout the Southeast. Qualified candidates will have the following credentials.

1) BS in computer science, engineering, mathematics or business administration (MS/MBA/CDP/CPA desirable but not mandatory.)
2) 3-7 yeers of diversified data processing experience including such arees as:
   - systems analysis end design
   - distributed processing
   - data base systems
   - deta communications networks
   - minicomputers
   - computer performance evaluation
   - financiel information systems
3) Professional manner and appearance. Hard working, ambitious and intelligent, with good oral end written communications skills.

Although well established, our deta processing management consulting services are undergoing a period of rapid growth in the southeast. We offer exceptional opportunities for career advancement and for broadening your functional and menagement skills.

To confidentially explore these opportunities, send your resume and compensation history to CW Box 3352, 797 Washington St., Newton, Mass. 02160.

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PROGRAMMER

Applicant should have 3-5 years experience with scientific languege and Fortran programming (also exposure to top down structure techniques). Ability to work with Engineering staff in formulating programs based on engineering end systems requirements is essential. Will develop innovative aircraft monitoring systems on sophisticated real-time distributed micro-computer network.

Excellent working conditions in an ettractive suburban location. For consideration, pleese send resume with earnings history to:
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Our rapidly expanding economy has craated exciting, PHILA. opportunities for experienced DATA PROCESSING professionals at all levels for the INSURANCE INDUSTRY.

INSURANCE exp in each of the listed D.P. positions is highly preferred.

All Fees Paid by our Cliant Co's

Data Base Tech. To 27K
3-5 yrs design and prog. major HONEYWELL, IDS, DATA BASE SYST. Knowl. TDS MDQS highly pfld.

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3-5 yrs HONEYWELL, TDS, Syst. Generation and prog. will set developmental standards.

Project Leader To $24K
Bkgd LIFE INSURANCE SYST & development. Document long-range EDP requirements.

Systems Analyst To $24K
H6000 TDS & IDS. Claims processing background.

Systems Prog To $23K
VM 370 CMS or CP 67 exp.

Systems Analyst To 20K
ANS Cobol &/or BAL bkgd. Variable length record & lge data file exp.

Prog/anlyst To $20K
5+ yrs ANALYTICAL exp W/REINSURANCE or INTERNATIONAL INSURANCE. ANS COBOL-lge scale bkgd.

Sr. Programmer To $20K
H6000 COBOL &/or EASYCODER-IDS & TDS. PROPERTY & CASUALTY bkgd.

Instructor To $19K
2+ yrs programming COBOL &/or BAL. Knldg JCL. LINKAGE EDITOR, DS & MODULARIZATION. Prior teach exp. NOT NEC.

Prog/Analyst To $18K
ANS COBOL, DS/DDS & MODULAR CONCEPTS. P&C INSURANCE, PERSONNEL, BUDGET & G/L exp

Methods Analyst To $18K
2+ yrs MANUAL FLOWCHARTS, WORK MEASUREMENT STUDIES & SYS & PROCEDURES. P&C INSURANCE a +.

Programmer To $17K
Bkgd time-sharing support, APL, PL-1 &/or ANS COBOL. Able communicator.

OPERATOR To $14K
3-5 yrs H6000. GCOS a +.

Data Support To $12K
Bkgd FLOWCHARTS & JCL. Responsible set up & preparation of data.

For confidential attention, plaase send resume to:

ROBERT HALF
PERSONNEL AGENCIES

2 Penn Center Suite 706
Philadelphia, Pa 19102
(215) 569-4580

PROGRAMMER
HANFORD, CALIFORNIA

Country living in the center of the state. Lower living costs, good schools, no comuting, temperate climate, colleges and a state university nearby. Hanford (pop. 17,500) is the County Seat.

Our small, progressive Data Processing Dept. needs a seasoned programmer with two years COBOL experienca on a medium to large computer.

Generous benefit package including a state-wida retirement plan and financial assistance for continuing education. Moving to a new computer facility in January, 1978. Start up to $15,350.

Apply: Kings County Personnel Dept., Courthouse, Box C, Hanford, CA 93230; or call, (209) 582-3211, ext. 447 or 183.

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PROGRAMMER/ ANALYST(2)

Applicant must have a degree in computar science and two to three years work experienca in business or finance accounting using the COBOL language. Experience working with Data Base Operations, package maintenance, programming, and some systams development. Minimum salary $12,460. Send resume to Julia Pietruszewski, University Personnel Servicas, University of Louisville, 105 W. Brandeis, Louisville, KY.

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PROGRAMMER ANALYST

Strong background in COBOL, a Bachelor's degree and two years programming experience including online systems are required. Knowledge of RPG, FORTRAN and/or BASIC is desirabla. Will participate in the design, programming, implementation and maintenanca of administrative and academic systems. Salary range from $12,000 to $15,000 plus ralocation expenses. Send resume to Mr. Paul LoRusso, Computer Center Director, College of the Virgin Islands, St. Thomas, Virgin Islands 00801.

An EOE/AA

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

FINANCIAL INFORMATION SYSTEMS MANAGER

A middle-management position responsible for 20-30 professionals involved with financial end personnel reporting systems. The successful candidate must have a proven record of accomplishment as a manager of computer professionals, specifically in financiel ereas. This position requies e minimum of 10 years' experience in development and implementation of computer systems with 5 years in a managerial role. A Master's degree or equivalent in Computer Science or Business Administration is required. Experience in systems enalysis, COBOL programming, Data Base Management Systems end on-line applications is highly desirable.

•SYSTEMS ANALYSTS
•PROJECT LEADER
•SENIOR PROGRAMMERS

Cendidates should have a college degree or equivelent, end a minimum of 4 years' experience in the development and implementation of business end management information systems along with proven capability in ANS COBOL. Experience with MARK IV end/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is e medium-sized community located close to top-flight winter sports ereas (Sun Velley, Jackson Hole, Grand Terghee) and unexcelled summer recreation ereas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If intersted and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401
U.S. Citizenship Required
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In Ohio call (collect)
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— Hospitality Industry —

EECO, a leader in the Hotel Computer Industry has openings for a few good quality dedicated professionals. These openings are located at our corporate headquarters in Santa Ana, CA.

Sr. Cobol Programmer — A minimum of 3-5 years Cobol programming experience helpful, but not essential.

Applications Designer — A minimum of 5 years experience in developing Front and Back Office systems for the hospitality industry. Applications knowledge would cover such areas as Reservations, Night Auditing, Guest Receivables, Payroll, General Ledger, Accounts Payable, etc.

Software Designer — A minimum of 5 years experience in the design and implementation of Assembly Language application programs in an on-line interactive environment using minicomputers.

Sr. Programmer — A minimum of 3 years experience in the design and implementation of application programs, utilities, diagnostics, and/or operating systems for an on-line interactive system using Minicomputer Assembler Language.

Our excellent company benefits include Group Health Insurance, liberal vacation and sick leave, pension, profit sharing and stock purchase plans, etc.

Qualified persons intersted in applying for one of the above openings should forward a resume to:

EECO
1601 E. Chestnut Avenue
Santa Ana, CA 92701
Attn: Personnel Department

PROGRAMMERS

If you are a programmer, programmer/analyst or systems analyst and would like the most individualized job search offered in the data processing field today, send your resume in confidence to:

DALLAS.
SEARCH E.D.P., INC.
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SUITE 1305
DALLAS TEXAS 75243

CINCINNATI
SEARCH E.D.P., INC
SUITE 35,
3181 LINWOOD AVE
CINCINNATI, OHIO 45208

CSC

Marketing Representatives

Join our Timesharing Team in Germany

The INFONET Division of our wholly-owned German subsidiary (CSI Deutschland, GmbH) is seeking Marketing Representatives for our office in Frankfurt.

Our continuing expansion has created immediate needs for individuals with successful sales records in timesharing (remote processing) services in the United States within the past 3-5 years. Qualified applicants must have lived in Germany, be fluent in the language and be totally familiar with German business traditions and the country's culture.

Offers of employment will be for long-term, permanent assignments and will include relocation assistance, 5 weeks annual paid vacation and an excellent German national fringe benefit package.

If you meet our qualifications, and are seeking an opportunity to return to Germany in affiliation with one of the world's leading timesharing companies, please submit a complete summary of education and work experience; family status (number and ages of children); foreign language abilities; present earnings and date of availability to:

R.M. DAVIDSON
DIRECTOR, INTERNATIONAL PERSONNEL

We also anticipate Marketing positions becoming available in Belgium, Holland and the United Kingdom.

COMPUTER SCIENCES CORPORATION
650 N. Sepulveda Blvd.
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Major Offices and Facilities throughout the World
Equal Opportunity Employer M/F

EDP SYSTEMS DEVELOPMENT

Want to combine the ideal career opportunity with your favorite lifestyle? NCR Special Systems Division needs your help now in developing advanced, high-technology EDP systems for customers around the world. You'll be doing important work in our Sorrento Valley facility, just three miles from the ocean and only minutes from Torrey Pines, La Jolla and downtown San Diego. You can live in the setting of your choice—beach, valley, mountain, country, small-town or urban—and still be only a short drive from work. Spend your leisure hours golfing, swimming, hiking, getting advanced degrees from major universities, attending theatrical, music, art and sports events, or soaking up the year-round sun. Pick your climate, too—from mild coast to dry desert. San Diego is a place of extraordinary choices—and right now the choice is yours.

COMPUTER PROGRAMMERS

The Special Systems Division has opportunities for software professionals in a broad range of disciplines and in all experience levels. Our current and firm future programs require top people with experience in any of the following areas:

- TELECOMMUNICATIONS SOFTWARE
- FILE PROCESSING
- NETWORK DEVELOPMENT
- LARGE MAINFRAME, MINI and MICRO PROCESSOR
- OPERATING SYSTEMS
- COBOL APPLICATIONS
- ASSEMBLY LANGUAGE

Assignments will include the development and implementation of various EDP systems for specific customers as well as the development of future NCR total systems; both requiring state-of-the-art knowledge.

Our benefit package is what you would expect from a major blue chip corporation. What you might not expect is the relaxed and very creative environment of this small, highly specialized division. The facilities are modern, comfortable, designed to provide an atmosphere in whicy every employee can achieve an uncommon degree of personal and professional satisfaction. May I offer you the opportunity to judge for yourself? Please send your resume (with salary history) to me.

Thom Harris, Employment Specialist

NCR

SPECIAL SYSTEMS DIVISION
4046 Sorrento Valley Blvd.
San Diego, Calif. 92121
We are an equal opportunity employer

**WANTED:
PROGRAMMER/ANALYST**

An aggresive individual is needed in the design, programming, and continuing software enhancement of a minicomputer-based system which will be installed in several hundred business locations. Facets of this unusual system range from realtime processing to commercial applications concurrent within a single computer. Experience in minicomputer programming is a requirement. First consideration will be given to those who are:

Familar with NOVA computers and RDOS; Proficient in FORTRAN or BASIC; Familiar with commercial applications; Challenged by an unconventional systems approach which requires creative skills.

This $100 million compay is located in the southeast. It still has a small management nucleus, and provides an unusually good working environment.

Contact, Chris Malle collect at (803) 242-6101.

**ASSISTANT DIRECTOR
COMPUTER CENTER**

Key position at leading southwestern university. Assist and serve as backup to the director. Coordinate support activities; supervise computer operations and systems programming. BS/BA required, advanced degree and university experience desirable. Three plus years in computing with at least one year supervisory. Salary commensurate with qualifications, excellent benefits. Resume by December 21, 1977 to B. Heinrichs, Personnel, Texas Christian University, Box 30797A, TCU Station, Fort Worth, TX 76129

TCU IS AN EOE/AAE

**Manager Of
Academic Computer
Center**

Housing IBM 1130, 32K core, card read/punch, 650 lpm printer, 4 Datum tape drives, Cal Comp DS-12 disk drive, Cal Comp 565 plotter. Hewlett Packard 2000 ACCESS time sharing system. Recent B.S. in Computer Science and some mathematics background desired. Half time teaching programming classes. Salary range $14,604 to $15,324. Deadline: December 15, 1977. Send resume to: Mr. Walter Wright, Director of Personnel, University of Redlands, Redlands, CA 92373. Equal Opportunity Employer M/F.

PROGRAMMERS AND SYSTEMS ANALYSTS

Put Your Experience To Work For You In Building A Better Career Opportunity

Sperry Univac has a variety of challenging opportunities waiting for you at one of our Minneapolis locations. These openings exist within our airline industry development and support group in the following disciplines:

- Design, implementation, and support of airline applications including reservations, ticketing, cargo, etc.
- Acceptance testing of application programs
- Technical support of customer airlines.

In addition to requiring experience within the specific areas mentioned above, it is also desirable to have a background in FORTRAN, UNIVAC 1100/DMS, and/or general UNIVAC 1100 series exposure.

We offer highly competitive starting salary, a comprehensive benefits program and outstanding professional and personal growth opportunities.

**FOR IMMEDIATE ATTENTION,
PLEASE CALL COLLECT OR
DIRECT YOUR RESUME TO:**
P.Y. Peterson

SPERRY UNIVAC

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St. Paul, MN 55164
(612) 456-2309**
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PRODUCT PLANNER

San Francisco Peninsula

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In 1976, for example, 1,218 different companies ran ads in *Computerworld* to look for computer people. This list of advertisers includes just about every type of organization you can think of—and some you might not. Here's a small sample of 1976 recruitment advertisers in *Computerworld* and the type of positions they were filling:

Companies: Honeywell Information Systems, Borden, Marathon Oil Co., Lockheed, The City of Chicago, Sperry Univac, Digital Equipment Corp., Dartmouth College, Princeton University Plasma Physics Laboratory, Data General, Amdahl, Exxon, Gould Instrument Systems Division, Xerox, National Semiconductor, The Chicago Board Options Exchange, ITT Domestic Transmission Systems, Inc., United Brands Co., New England Mutual Life Insurance Co., Greyhound Computer Corp., GenRad, W.R. Grace & Co., Firemen's Fund American Insurance Co., Datapoint Corp., National Bank of Alaska, Schering-Plough Corp., Rockwell International, Massachusetts Institute of Technology, Merrill, Lynch, Pierce, Fenner & Smith, Inc., Booz, Allen & Hamilton, Inc., Levi Strauss & Co., Kawasaki Motors Corp., AMF Harley-Davidson, Winnebago Industries, Crown Zellerbach, University of Illinois, The American Bar Association, Flour Corp., Parke Davis, Tennessee Valley Authority, Westinghouse Computer & Instrumentation Division.

Positions: Systems Software Development, Software Analysts, Systems Programmers, Computer Performance Evaluation Specialist, Information Processing Professionals, Mainframe Sales Representatives, Manager, Corporate Information Processing, Computer Scientist, Senior Systems Programmer, Computer Systems Gurus, Professional Large Scale Computer Systems Sales, Computer Sciences/Data Base Engineer/Programmer, Engineers and Programmers for Logic and Systems Design and Testing, POS Applications Analyst, Manager of Floor Operations Support, Computer Communications Network Development, EDP Technical Support, Systems Software Programmer, Computer Leasing Sales, Senior Systems Analyst, Operations Manager, Senior Computer Consultant, Manager of Advertising and Public Relations, Data Processing Manager, Scientific Programmer Analysts, Senior Analysts, Director of Computer Services, Data Base Administrator, Job Set-Up Coordinator, Head of Information Services, Executive Director, Director Computer Services, Distributor Sales Manager, National Marketing Manager, Director of Systems and Operations, Director of Academic Computer Services, Manager of Systems and Programming, Developer of Management Information Systems, Computer Software Scientist, Biomedical Computer Engineer, Computer Services Manager.

And they get results!

Here's what three recruitment specialists have to say about their advertising in *Computerworld:*

"*Computerworld* is more dependable than a local newspaper. First of all, when you go into a city paper you're only going to reach the percentage of the population in that area that are data processing people. And secondly, you're only going to reach the percentage of DP people who are reading the paper that day. But with *Computerworld*, we can depend on being able to reach qualified data processing people—maybe managers, programmers or analysts, but at least all people in our specialty. The response is quantitatively better as well. For instance, our first ad in *Computerworld* (for a Kansas City opening) got 45 responses, whereas a comparable ad in the Kansas City paper would have only gotten one or two."

Richard Kramer
President
Electronic Data Personnel
1006 Grand Avenue
Kansas City, MO 64106

"The demand for computer people is even stronger now than it was back in the 'go-go' days of the '60s, particularly at the individual contributor level. And *Computerworld* seems to filter through to these people very well—more so, perhaps, than any other publication we've used.

"I might add that Source EDP has used them all. Since 1962 we've become, with 35 branch offices in the US and Canada, the largest non-franchised recruiting firm in North America that specializes in data processing. I think our continued exposure in *Computerworld* is one of the factors that has helped us expand to our present level . . . "Since it's published on a weekly basis, in newspaper format, I think *Computerworld* generates a sense of urgency that simply does not exist in the typical monthly trade magazine. People tend to respond to it much more quickly.

"*Computerworld* also comes out on top in comparison to the many local media Source EDP uses. In terms of cost per response, *Computerworld* is a great deal cheaper than a local newspaper since the latter has a general audience. In contrast, *Computerworld* hits our market—the DP professional—right on the button. It also has a tremendous pass-along factor. Some of our ads generate responses for as long as 4 months after publication. Believe me, if *Computerworld* didn't work for us we wouldn't be in every issue."

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The Executive Office of Administration and Finance, Commonwealth of Massachusetts will hold a public hearing on December 28, 1977 at 10 A.M. on the 21st floor of the John W. McCormack Building, One Ashburton Place, Boston, MA. 02108, for the purpose of revising rules and regulations for the procurement of data processing equipment, systems and related services. Interested persons are invited to attend and submit testimony. Written testimony is preferred and should be sent to Rules and Regulations (DP), Room 194 State House, Boston, MA 02133.

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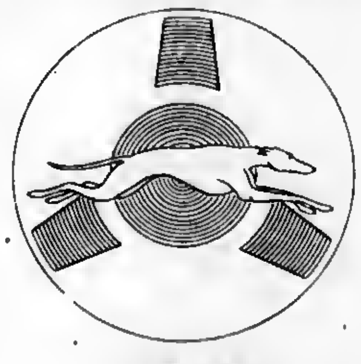

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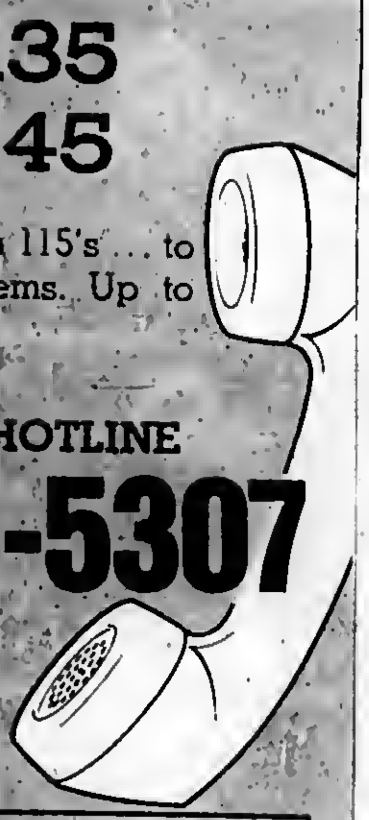

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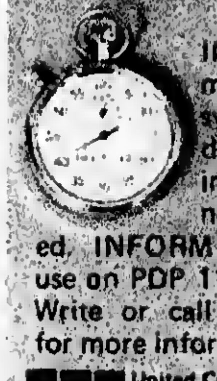

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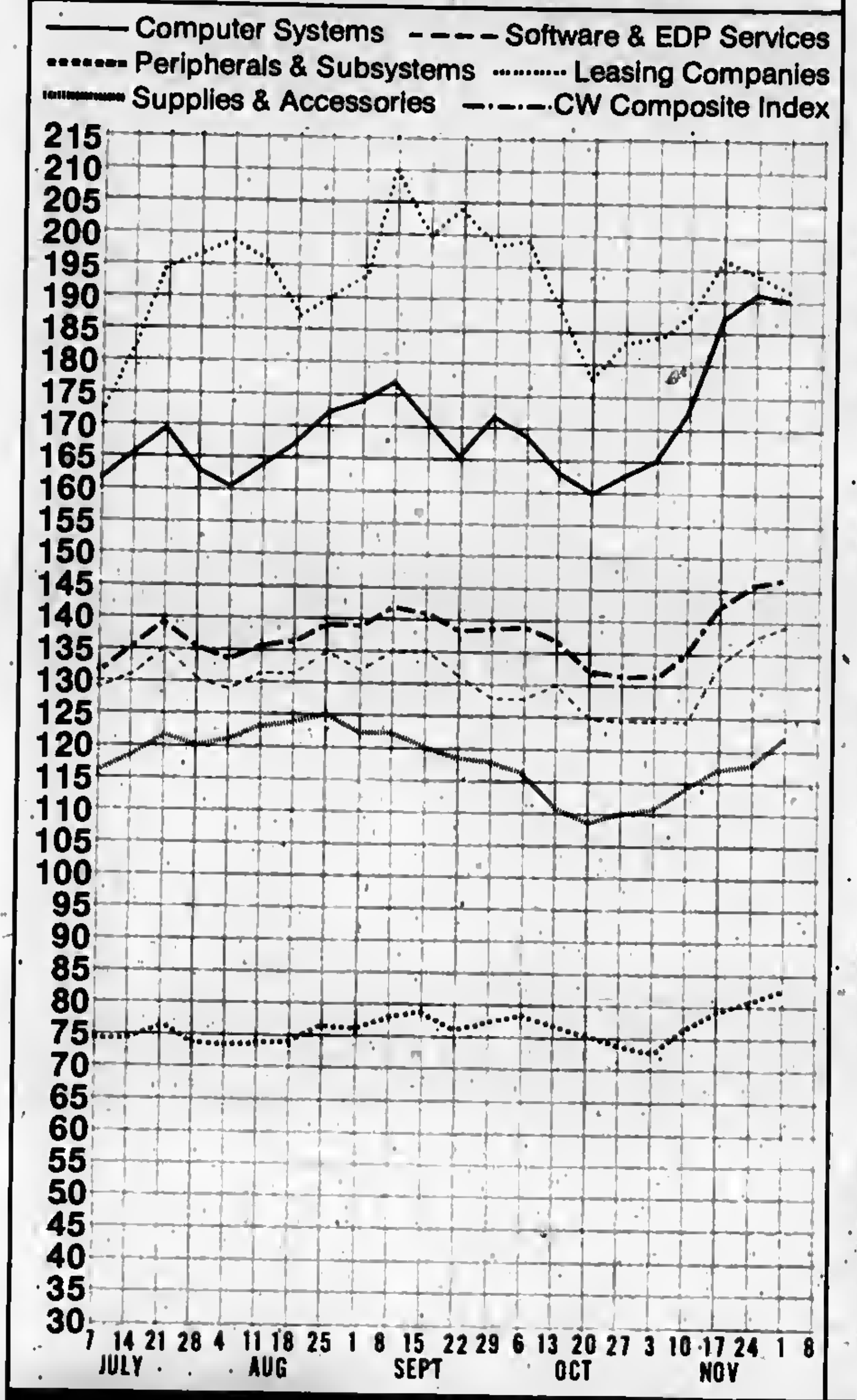

Earnings Reports

FOUR-PHASE SYSTEMS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.50	$.54
Revenue	22,690,00	16,024,000
Tax Cred	263,000	946,000
Earnings	2,075,000	2,148,000
9 Mo Shr	1.69	1.72
Revenue	65,602,000	45,781,000
Tax Cred	1,790,000	2,281,000
Earnings	6,919,000	6,371,000

GRAHAM MAGNETICS
Three Months Ended Sept.30

	1977	1976
Shr Ernd	$.30	$.16
Revenue	4,616,327	3,984,483
Earnings	289,381	151,845

GRI
Three Months Ended Sept. 3

	1977	a1976
Shr Ernd	$.06	.....
Revenue	13,238,000	$16,040,000
Earnings	163,000	(466,000)
9 Mo Rev	32,406,000	43,165,000
Loss	325,000	543,000

a-Restated.

HARRIS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.86	a$.60
Revenue	186,573,000	126,770,000
Earnings	11,312,000	7,694,000

a-Adjusted for a two-for-one stock split paid in December 1976.

HAZELTINE
Three Months Ended Sept. 30

	1877	1976
Shr Ernd	$.48	$.45
Revenue	24,274,000	21,705,000
Earnings	960,000	909,000
9 Mo Shr	1.26	2.90
Revenue	68,975,000	66,477,000
Tax Cred	.....	1,050,000
Earnings	2,540,000	a5,814,000

a-Includes $2,880,000 income from settlement of company's claim under a contract with U.S. Air Force.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEONESDAY, NOVEMBER 30, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

E K C H		1977 PANGE (1)	CLOSE NOV 30 1977	WEEK NET CHNGE	WEEK RCT CHNGE
O	AMOANL COPR	22- 48	44 1/2	+ 3/4	+1.7
N	BURROUGHS COPR	55- 91	69 1/4	-1 5/8	-2.2
O	COMPUTER AUIONATION	18- 30	27 3/8	+ 3/8	+1.3
N	CONTROL OATA COPP	20- 27	25 1/2	-1 1/4	-4.6
O	CPAY RESEARCH INC	15- 29	27	+1 1/2	+5.8
N	OATA GENERAL COPR	35- 54	50 1/4	-1 3/4	-3.3
N	OATAPOINT CORP	18- 40	37 5/8	-2 3/8	-5.9
N	OIGITAL EOUIRMENT	37- 53	47 1/8	-2 3/8	-4.7
N	ELECTRONIC ASSOC.	2- 3	2 1/2	+ 1/8	+5.2
A	ELECTRONIC ENGINEER.	8- 12	10 7/8	- 3/8	-3.3
O	EOUP-RHASE SYSTEMS	13- 21	19 1/2	- 1/2	-2.5
N	FOXBOPO	41- 54	48 1/2	+3 7/8	+8.6
O	GENERAL AUTOMATION	6- 9	7 1/4	+ 1/2	+7.4
O	GRI COMPUTER CORR	1- 1	3/4	0	0.0
N	NEWLETT-RACKARO CO	69- 87	72 7/8	-3 1/2	-4.5
N	NONEYWELL INC	43- 55	46 7/8	-2 3/8	-4.8
N	IBM	245-286	264	-2 1/4	-0.8
O	MANAGEMENT ASSIST	5- 9	8 7/8	0	0.0
O	MICROOATA CORR	7- 18	12 1/4	+ 3/4	+6.5
O	MOOULAR COMPUTER SYS	5- 9	8 3/R	-1	-10.6
N	NCP	32- 47	40 3/4	-2 1/8	-4.9
O	RRIME COMRUTER INC	12- 23	22 3/R	+ 7/8	+4.0
N	PERKIN-ELMEP	17- 22	21 3/8	+ 7/8	+4.2
N	RAYTHEON CO	16- 35	33 5/8	-1 1/8	-3.2
N	SPERRY RANO	30- 42	34 3/4	0	0.0
O	SYCOR INC	8- 15	13 5/8	- 3/4	-5.2
A	SYSTEMS ENG. LARS	5- 10	9 5/8	+ 3/4	+8.4
A	WANG LABS.	10- 14	12 7/8	- 7/8	-6.3

LEASING COMRANIES

E K C H		1977 PANGE (1)	CLOSE NOV 30 1977	WEEK NET CHNGE	WEEK RCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	0	0.0
O	BOOTNE COURIER COPP	8- 10	12 1/2	0	0.0
O	COMOISCO INC	10- 14	12 1/2	- 1/4	-1.9
A	COMMERCE GROUR CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRR	1- 2	3/4	- 1/8	-13.3
N	OATPONIC RENTAL	0- 2	1	- 1/8	-11.1
A	DCL INC	1- 3	2 3/9	- 1/8	-5.0
N	OPF INC	6- 10	9 1/4	+ 1/4	+2.7
N	ITEL	13- 22	19 5/8	- 7/8	-4.2
N	LEASCO CORR	19- 27	24 3/4	0	0.0
O	LEASRAC CORR	1- 2	7/8	+ 1/8	+16.6
O	NRG TNC	1- 1	1/8	0	0.0
A	PIONEER TEX CORR	5- 11	5 3/4	0	0.0
N	U.S. LEASING	10- 16	14 3/4	- 3/8	-2.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-RALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTEP
O-T-C PRICES ARE BID RRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EOR SFRVICES

E X C H		1977 RANGE (1)	CLOSE NOV 30 1977	WEEK NET CHNGE	WEEK RCI CHNGE
O	AOVANCEO COMP TECH	0- 2	7/8	+ 1/8	+16.6
O	ANACOMP INC	7- 10	9	+ 3/R	+4.3
A	ARPLIEO OATA PES.	5- 10	8 3/4	+ 5/8	+7.6
N	AUTOMATIC OATA RROC	23- 30	28 1/4	- 1/8	-0.4
O	COLEMAN AMEPICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SEPV NETWOPK	9- 15	12	- 3/4	-5.8
O	COMP ELECTION SYSTMS	6- 10	9	- 1/8	-1.3
O	COMPUTER HOPIZONS	1- 1	1 1/4	0	0.0
O	COMRUTER NETWOPK	6- 11	9 7/8	0	0.0
N	COMPUTER SCIENCES	7- 9	R 3/4	- 1/R	-1.4
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	2 1/4	+ 3/R	+20.0
O	COMSHARE	5- 8	7 3/4	- 1/4	-3.1
O	OATA OIMENSIONS INC	3- 5	3 3/4	0	0.0
O	OATATAB	1- 2	1 3/8	+ 1/8	+10.0
N	ELECTRONIC OATA SYS.	14- 20	16 1/4	+ 3/4	+4.8
O	INSYTE CORR	2- 3	1 1/4	- 1/8	-9.0
O	IPS COMRUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/4	- 1/4	-6.2
O	KEYOATA COPR	1- 3	1 3/8	0	0.0
A	LOGICON	7- 17	13 1/4	-1 1/2	-10.1
A	MANAGEMENT OATA	1- 2	1	- 1/8	-11.1
A	NATIONAL CSS INC	10- 16	15 7/8	+ 1/2	+3.2
O	NATIONAL OATA CORP	4- 7	7	0	0.0
A	ON LINE SYSTEMS INC	16- 22	19 1/4	- 5/8	-3.1
N	PLANNING RESEARCH	3- 6	5	+ 1/2	+11.1
O	RROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIOATA INC	2- 3	2 3/4	- 3/8	-12.0
O	REYNOLOS & PEYNOLD	17- 21	20	+ 1/2	+2.5
O	SCIENTIFIC COMPUTEPS	1- 4	4	+ 1/4	+6.6
O	TYMSHARE INC	14- 23	21 1/4	- 5/8	-2.8
A	URS SYSTEMS	4- 5	4 7/8	- 1/8	-2.5
N	WYLY COPR	1- 2	7/8	+ 1/8	+16.6

RERIRHEPALS & SUBSYSTEMS

E X C H		1977 RANGE (1)	CLOSE NOV 30 1977	WEEK NET CHNGE	WEEK RCI CHNGE
N	AOORESSOGRAPH-MULT	10- 16	15	0	0.0
O	AOVANCEO MEMORY SYS	7- 9	R 1/4	- 1/4	-2.9
N	AMREK CORP	8- 11	9 172	- 1/4	-2.5
O	ANOERSON JACOBSON	3- 5	4 5/8	- 1/8	-2.6
N	APPLIEO OIG OATA SYS	10- 20	13 7/8	0	0.0
O	BEENIVE INT'L	5- 12	5 5/8	- 1/8	-2.1
A	ROLT.BERANEK & NEW	7- 9	7 1/2	- 1/4	-3.2
N	BUNKER-RAMO	8- 13	12 1/2	- 1/4	-1.9
A	CALCOMP	3- 5	3	+ 1/4	+9.0
O	CANBRIOGE MEMOPIES.	1- 4	3	0	0.0
N	CENTRONICS OATA COMP	20- 30	20 1/2	-1 3/4	-7.8
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	5- 8	7 1/2	+ 3/4	+11.1
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EOUIRMENT	2- 3	2 7/R	0	0.0
O	COMPUTER TPANSCEIVER	1- 1	1 1/8	0	0.0
O	COMTEN	9- 13	11	+ 1/4	+2.3
N	CONRAC CORR	19- 28	24	+1 3/4	+7.8
O	OATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	OATA 100	6- 11	10 1/2	+1 3/R	+15.0
A	OATA PROOUCTS CORR	9- 19	17 7/8	+ 1/2	+2.8
O	OATA TECHNOLOGY	3- 4	4 1/4	+ 1/4	+6.2
O	OATUM INC	1- 2	2	0	0.0
O	OECISION OATA COMPUT	2- 3	1 7/8	- 1/4	-11.7
O	OELTA OATA SYSTEMS	1- 1	3/8	0	0.0
A	OOCUMATION INC	6- 10	10	+1	+11.1
O	OATAPAN CORR	2- 21	20	+4 3/4	+31.1
N	ELECTRONIC N & M	4- 5	4 1/R	+ 1/8	+3.1
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 5/8	+ 1/4	+18.1
N	HAZELTINE CORP	8- 12	9 7/8	- 1/2	-4.8
N	HARRIS CORR	28- 44	41 1/R	+ 1/8	+0.3
A	INCOTERM CORR.	10- 19	1R 3/8	- 1/4	-1.3
O	INFOREK INC	4- 7	6 3/8	+ 1/4	+4.0
O	INFORMATION INTL INC	9- 14	9 1/2	- 1/4	-2.5
O	INTEL CORR	38- 57	45 1/2	- 1/2	-1.0
A	LUNOY ELECTRONICS	3- 6	3 3/4	- 1/8	-3.2
O	MSI OATA COPR	6- 14	14 1/8	+ 7/8	+6.6
O	MEMOREX	23- 34	30 1/4	- 1/2	-1.6
N	MOHAWK OATA SCI	5- 8	6	0	0.0
O	RENRIL CORP	2- 5	5 1/4	- 1/8	-2.3
N	RERTEC CORR	7- 11	10 1/2	+ 3/4	+7.6
A	ROTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOP CORP	3- 5	3 1/8	0	0.0
O	RECOGNITION EOUIR	6- 10	7	- 1/4	-3.4
O	SCAN OATA	1- 2	1	+	+13.3
O	STOPAGE TECHNOLOGY	10- 20	19 7/8	- 1/8	-0.6
O	T RAR INC	7- 13	13	- 3/8	-2.8
O	TALLY CORR.	4- 6	4 1/4	+ 1/8	+3.0
A	TEC INC	7- 10	7 1/4	0	0.0
N	TEKTRONIX INC	29- 40	37 1/4	-1 7/8	-4.7
N	TFLEK	2- 3	2 3/4	+ 1/4	+10.0
O	WILTEK INC	1- 1	5/8	+ 1/8	+25.0

SUPRLIFS & ACCESSORIFS

E X C H		1977 RANGE (1)	CLOSE NOV 30 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PROOS	6- R	6 3/4	0	0.0
O	BALTIMORF BUS FORMS	1- 4	1 3/4	+ 5/8	+55.5
A	BARRY WRIGHT	10- 15	14 5/8	- 1/8	-0.8
O	CYBERMATICS INC	1- 1	7/8	- 1/8	-12.5
O	DUPLEX RROOUCTS INC	14- 19	19	- 1/4	-1.2
N	ENNIS BUS. FORMS	6- 7	6 3/4	+ 3/4	+12.5
O	GRANAM MAGNETICS	11- 18	17 1/2	0	0.0
O	GRAPHIC CONTROLS	13- 18	15 1/2	+ 1/4	+1.6
N	3M COMPANY	46- 56	48 3/8	- 3/4	-1.5
O	MOORE CORR LTO	24- 37	27	+1	+3.8
N	NASHUA CORP	16- 28	18 3/4	-1 1/2	-7.4
O	STANOARO REGISTER	18- 25	22 3/4	- 1/4	-1.0
O	TAB PROOUCTS CO	10- 19	10	+ 1/4	+2.5
N	UARCO	18- 22	20 1/8	- 1/8	-0.6
A	WARASH MAGNETICS	10- 15	13	- 1/4	-1.8
N	WALLACE RUS FORMS	17- 21	20 1/4	+ 3/4	+3.8

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NEWSPAPER

Human Rights

ACM Cuts Ties To Soviet Union

By Ann Dooley
CW Staff

NEW YORK — The Association for Computing Machinery (ACM) has severed its relations with the Soviet Union "as a result of Soviet persecution of colleagues," particularly computer chess expert Anatole Sharansky.

ACM announced its intentions in a letter to the president of the Soviet Academy of Sciences, A.P. Aleksandrov, saying it "will not cooperate with or cosponsor meetings in your country until the climate of intellectual freedom clearly improves."

The letter asked Aleksandrov to personally intervene on Sharansky's behalf.

Letter to Members

ACM also sent a letter to each of its 35,000 members requesting them to consider the situation of Sharansky and others like him when deciding whether to visit the Soviet Union or to publish in Soviet journals.

Sharansky has received worldwide notice and support since he was jailed on March 15 for alleged treason and CIA activities. He has been held without formal charges since that date; Soviet authorities have indicated his trial will begin this month.

Prominent people outside of the computer industry have also taken up Sharansky's cause. New York Senators Jacob Javits and Daniel Patrick Moynihan recently joined a committee organized by the Greater New York Conference on Soviet Jewry to obtain Sharansky's release.

Warning From Carter

President Carter and Secretary of State Cyrus Vance have also cautioned the Soviet leaders against continuing with the trial of Sharansky and others, warning that it could harm Soviet-American relations.

In addition to the ACM, other computer scientists have joined the protest against Sharansky's imprisonment. Their numbers include 300 attendees at the Fifth International Joint Conference on Artificial Intelligence, who wrote to Soviet Communist Party Chief Leonid Brezhnev asking for Sharansky's release.

But Overtures Spurned

IBM, Justice Huddle On Settlement

By E. Drake Lundell Jr.
And Catherine Arnst
CW Staff

WASHINGTON, D.C. — One of IBM's top outside attorneys here huddled recently with the No. 2 man in the Justice Department to discuss possible ways of settling the government's almost nine-year-old antitrust suit against the firm, Justice Department sources said last week.

Lloyd Cutler of Wilmer, Cutler and Pickering — a lawyer who has handled the delicate negotiations leading to out-of-court settlements in antitrust cases in the past and who now represents IBM — met with Associate Attorney General Michael Egan and John Shenefield, head of the Antitrust Division, the sources said.

Cutler reportedly made several specific proposals for ending the case, although all attempts to confirm that with any of the parties to the meeting were rebuffed last week when all three refused to answer or return more than two dozen phone calls.

However, the settlement overture apparently was rejected and lawyers directing the case told the trial team in New York last week a settlement was not in the wind despite the circulation of "rumors" about IBM political pressure for such a move.

Letter Not Discussed

The meeting was ostensibly called in order to review charges made in a letter to Shenefield from Nicholas deB. Katzenbach, IBM chief counsel, blasting the conduct of Antitrust Division attorneys in the handling of certain documents.

In particular, Katzenbach reportedly said documents allegedly linking him with the laundering of language of memos from top IBM officials [CW, Dec. 5] were an "unwarranted" attack on his integrity.

However, the subject matter of the letter was reportedly not discussed at the meeting, with Cutler instead suggesting the parties begin a "dialogue" aimed at settling the case.

In one proposal, Cutler suggested a three-person commission be established to review the case and make recommendations on how it should be settled, the sources indicated.

The inclusion of Egan in the meeting was particularly meaningful, sources.

(Continued on Page 6)

Bell-Led Task Force Urges Plan Limiting Net Choices

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — An industrywide reorganization of basic telecommunications services that could drastically alter the cost for business users' phone service has been proposed by a telephone industry task force.

Described as a "conceptual framework," the proposal was sent to the House and Senate subcommittees on communications. It contains four categories under which all telecommunications services would be provided by existing carriers and their competitors, the specialized carriers.

In general, the task force's proposal eliminates all methods by which users of private systems now reach the phone network's dial-up facilities and eliminates the foreign exchange services now available from local telephone companies for such connections, according to an AT&T spokesman.

Anticompetitive Move?

Although some industry observers called the proposal concessionary because it appears to provide ground rules under which competition could exist, others said the plan merely reaffirms the telephone industry's determination against sharing any of its business with new carriers.

The task force — made up of AT&T and smaller telephone companies across the nation — prepared the framework at the request of the House subcommittee, which is currently working on a rewrite of the Communications Act of 1934. All interested groups had been requested to submit ideas to the subcommittee, according to a spokesman for subcommittee member Rep. Tim Wirth (D-Colo.).

Under the most straightforward part of the task force's proposal, Category I, existing telephone companies would continue to provide regular local and long distance telephone service. Rates would continue to be averaged nationwide to keep down costs in rural

(Continued on Page 6)

Mini/Micro Options Grow

CW Photo by E. Surden

Attendees take in attractions of Mini/Micro.

By Esther Surden
CW Staff

ANAHEIM, Calif. — Minicomputer and microcomputer vendors introduced a raft of products at last week's Mini/Micro Computer Conference and Exposition, ranging from a desktop computer from Pertec Computer Corp. to Trident disk drive subsystems for use with minicomputers from California Computer Products, Inc.

Most of the products introduced here were peripheral equipment, showing that area to be one of great user interest.

Pertec dubbed its desktop computer offering the Attache. Weighing 25 pounds, the system is based on an 8080 microprocessor and comes in a white case with an upper and lower case Ascii keyboard.

The system uses the S-100 bus configuration and includes a 10-slot bus, a spokesman said. Standard features include LED indicators for on/off and system status, a programmable read-only memory monitor that controls operation of the system from the keyboard and a CRT output jack, the firm said.

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$4,500 in Phony Deposits

Two Indicted in ATM Fraud Caper

By Catherine Arnst
CW Staff

MEMPHIS, Tenn. — Two men allegedly bilked the Union Planters National Bank (UP) here of $3,885 by making false deposits and real withdrawals at the bank's automated teller machines (ATMs).

Alexander Bucarz and Steven Richardson have been indicted for conspiring to defraud the bank after $4,500 in phony deposits were made to Bucarz's account, and $3,885 was withdrawn over a weekend in June. The trial of the two men, who pleaded innocent, is scheduled for early next month.

According to Sgt. F.J. Maxey, the officer in charge of the case, Bucarz applied for a debit card from the bank to be used at one of its Docutel automatic tellers, which operate 24 hours a day. Bucarz then allegedly told Richardson his secret code and went to California, leaving directions for Richardson to get the card from his house when it arrived in the mail.

After getting the card, Richardson went to various ATMs and made two bogus deposits of $1,000 and $3,500 to Bucarz's account, according to the charges. With the UP system, deposits are made by keying in the amount and depositing an envelope with the money. However, empty envelopes were deposited to Bucarz's account.

The system automatically credits an account with a deposit, which allowed immediate withdrawals. Most of the withdrawals were made at Addressograph-Multigraph point-of-sale terminals UP has installed in supermarkets. There terminals allow customers to either credit their groceries to their account or make withdrawals at the supermarket, according to James Miller, security manager at UP. Richardson then mailed a cashier's check for $1,600 to Bucarz in California, Miller said.

The bank's security department was notified of the theft by the teller who processed the deposits. The bank had been keeping track of others in the Memphis area who had attempted similar schemes and through these persons gained Richardson's name, supposedly because he had been bragging about the crime, Maxey said.

When the bank contacted the police, Maxey discovered an outstanding warrant in the files for Richardson's arrest for passing bad checks. That warrant was served and while the suspect was being questioned, he implicated both himself and Bucarz in the UP crime, Maxey said.

Bucarz was charged with obtaining money under false pretenses and Richardson with violation of the state's recently passed debit card law; if found guilty, each can receive sentences of three to 10 years. Both have been convicted on previous felony charges.

The bank has never been the victim of this type of fraud before, Miller said. However, when the system was designed, it was anticipated that a card holder would try to get from his account money that he didn't have and the cost of the system was figured to cover those types of losses, he said.

What made this particular crime different was the conspiracy element, in which one person allegedly used another person's card. The program has now been changed to prevent such a crime from being perpetrated again, he said, although he would not describe these changes.

Miller justifed the vulnerability of the bank's system by citing the added customer convenience it provides. "I think you'll find that our terminals are some of the most used in the country" according to most studies done, he said. Had the media not exposed this case to the extent it did, the bank might never have made the changes because most people would not be aware of the vulnerability existed, he added.

The bank's ATMs are tied to an IBM 360/65 mainframe.

Firm Suspects DP Finagling In $500,000 Plastics Theft

By Tim Scannell
CW Staff

BRAINTREE, Mass. — Detectives here confiscated four truckloads of plastic merchandise and company records from Chemical Maintenance Corp. in what is believed to be a computer-assisted larceny scheme involving $500,000 worth of goods.

The alleged crime apparently involved underbilling for plastic bags sold by American Cellophane and Plastic Films Co., Inc. to Chemical Maintenance Corp., according to the complaint filed with Suffolk Superior Court.

American Cellophane officials believe that an unidentified employee allegedly collaborated with Chemical Maintenance Corp. to input false payment information into American Cellophane's DP system, Assistant District Attorney Joseph Doyle said.

Sources believe the fraud was committed through use of a flagging code that would prompt the CPU to falsely indicate certain accounts receivable as paid.

Officials of American Collophane believe the scheme went on for approximately two years. Their records were also impounded and will be included along with the evidence presented before a grand jury.

Neither side would comment on the matter, pending an investigation.

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Peripherals Dominate Debuts at Mini/Micro

(Continued from Page 1)

The basic configuration costs $1,449 assembled and tested. The firm can be reached at 21111 Erwin St., Woodland Hills, Calif. 91367.

Calcomp came to Mini/Micro with three disk subsystems, a floppy disk system and its recently announced Model 906 on-line plotter controller. The disk drive systems were designed to operate with the Digital Equipment Corp. PDP-11 family, the Data General Corp. Nova or Eclipse systems and the General Automation 16 series.

The drives incorporated in the systems handle from 25M bytes to 300M bytes of storage on each drive; a subsystem can include up to 2.4G bytes, a spokesman said.

The 2251 controller for DG minis costs $8,294; the 2350 for GA systems is priced at $8,900 and the 2551, which interfaces to DEC systems, costs $8,294.

Calcomp Floppy

The floppy disk system was designed for use with any processor having an RS-232C communications port, the firm explained. It includes two floppy disk drives, power supply, cables and a microprocessor-driven controller that supports as many as four drives and up to two RS-232C connected drives, the spokesman said.

It can use either single-sided or double-sided media. The subsystem costs $3,630 with an an RS-232C interface or S-100 bus interface and $3,830 with an LSI-11 interface. These prices include two double-sided drives, a controller and the interface. Calcomp is at 2411 W. La Palma, Anaheim, Calif. 92801.

Intel Add-In

An add-in memory card said to be software-compatible with DEC PDP-11/04 and 11/34 minis was announced by Intel Memory Systems. The card uses 8K and 16K random-access memory devices to provide 32K, 48K or 64K by 18 bits of memory capacity. The card fits into a single PDP-11 hex height card slot, the company said.

Parity checking is a standard feature of the system while a status control register allows the host system to locate and record a failing memory address, a spokesman explained. The use of a DEC parity controller module is reportedly unnecessary.

The 32K version costs $2,625. The 48K and 64K version will not be available until the second quarter of 1978, the company noted from 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Memorex Drive

Memorex Corp. also came to the show with a minicomputer peripheral — a dual-headed floppy disk drive. Called the 552, the unit incorporates two ceramic read/write heads that allow recording or reading of data on both sides of a dual-sided floppy disk, a spokesman explained. The 550, Memorex's single-sided drive, can be converted to the 552 by a "simple factory procedure," the firm said.

The unit offers a capacity of up to 1,600K bytes of unformatted data or 492K bytes in IBM 4964 format. Access time is 3 msec per track and the data transfer rate is 250K byte/sec in single-density mode. Addition of a controller will allow the unit to be operated in double-density mode "without modification," the company said.

The 552 floppy disk drive costs $585 in OEM quantities. Memorex is located at San Tomas at Central Expy., Santa Clara, Calif. 95052.

Two drum-type form printer mechanisms were brought to the show by Anadex, Inc. The FPM-600 and the FPM-700 are numeric and alphanumeric printer units that can print up to 19 columns on either standard medical forms or forms of varying widths, a spokesman said.

The FPM-600 costs $425 and the 700 costs $695 for the basic unit, the spokesperson noted. The company is at 9825 DeSoto Ave., Chatsworth, Calif. 91311.

A company called Innotek brought its MT-100 mini cartridge tape system that can directly interface to the S-100 bus. The MT-100 unit incorporates a Qantex M200 minidrive and costs $845. Another drive can be added for $495. Innotek is at 23059 Leonora Drive, Woodland Hills, Calif. 91367.

Centronics Printer

Centronics Data Computer Corp. came to Mini/Micro with another printer designed for use with microcomputers. Called the Microprinter-S1, it features a 7-bit Ascii serial RS-232C interface with parity and switch-selectable transmission rates from 50 bit/sec to 9,600 bit/sec, the firm said. The unit uses aluminum-coated paper.

Printing is accomplished through the discharge of an electric arc to penetrate the coating, which is less than one micron thick, a spokesman said. The printer can operate at 150 line/in. and five, 10 or 20 char./in. are software selectable. It comes with a 192-char. first-in-first-out buffer. Priced at $695, the first unit will be available in the first quarter, Centronics said from its headquarters in Hudson, N.H. 03051.

Tax Group Asks for Help

MONTVALE, N.J. — The New York State Tax Commission has asked the Association of Data Processing Service Organizations (Adapso) to form a task force to aid in drafting state sales tax regulations for software and services.

The task force will solicit examples of problems believed to be unique in these areas so that its proposals may consider as many problem situations as possible.

Those interested in providing material to the task force should promptly contact Bob Goldstein, Adapso, 210 Summit Ave., Montvale, N.J. 07645.

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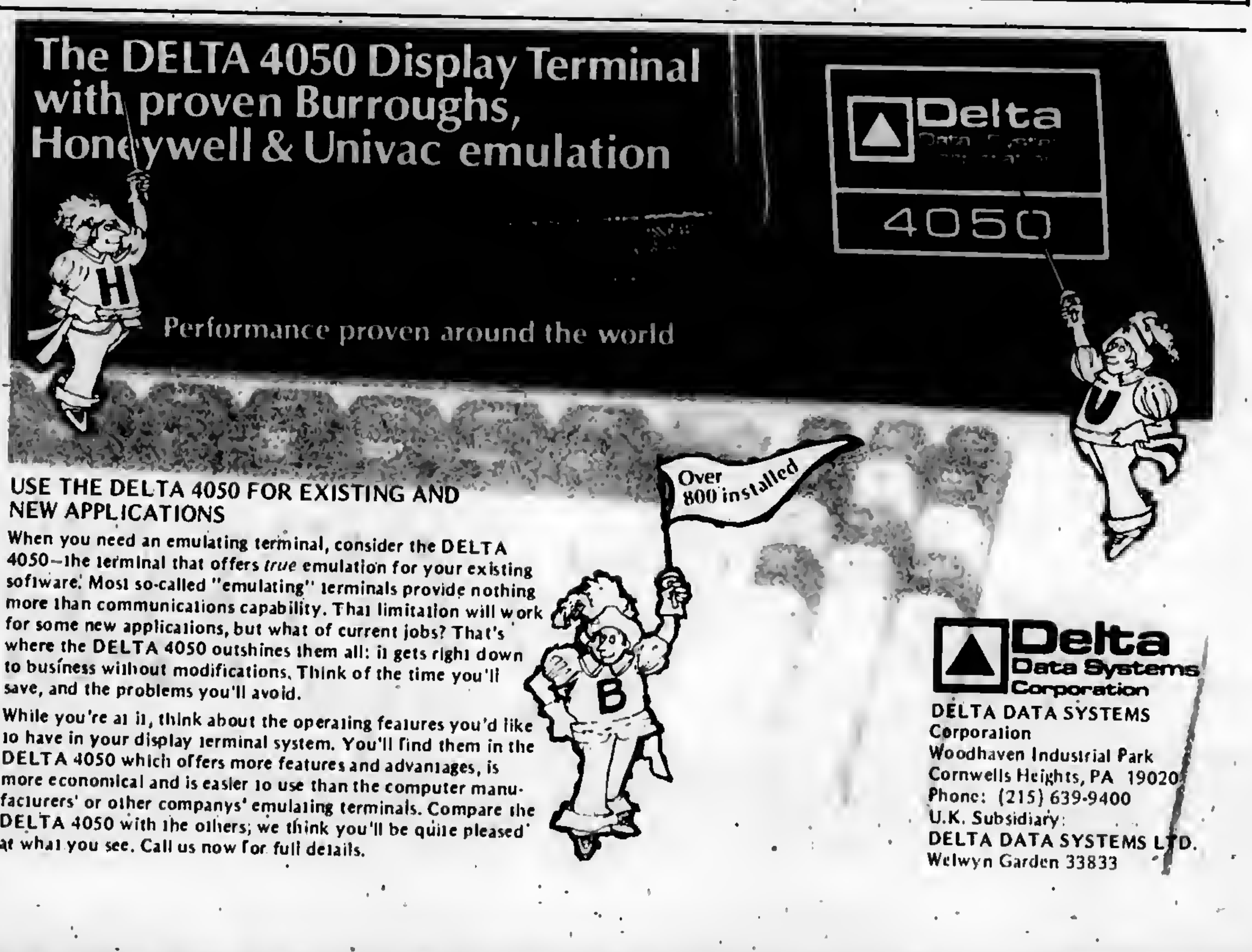
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IBM Encryption Devices Designed for Point-to-Point And Intranet Transmissions

By Brad Schultz
CW Staff

WHITE PLAINS, N.Y. — IBM has announced three encryption devices — two for protection of point-to-point data transmissions and a third for security of advanced DP installations.

The tabletop 3845 and rack-mounted 3846 encryption devices protect point-to-point transmissions — between a computer and inquiry terminal, for example — and are adaptable to a variety of hardware manufacturers, the spokesman said.

The IBM Cryptographic Subsystem, the third product announced, protects data networks, he continued, noting that it is a combination of hardware and software for IBM 370 CPUs.

Encryption entails transmitting information in secret code form and deciphering it at the receiving end, the spokesman explained, noting that by this scheme information intercepted en route would be incomprehensible to anyone not having the "key" by which the information is encoded and decoded.

An encryption key is a string of bits, he said, adding that since each bit may be either "0" or "1," the 56-bit key IBM uses may have 2^{56} — or about 72 quadrillion — distinct combinations.

IBM's encryption method has been approved as a Federal Information Processing Standard by the National Bureau of Standards [CW, Dec. 20, 1976], although its impregnability has been questioned [CW, Dec. 5, 1977].

Users can install both 3845 and 3846 devices and change keys by means of a hand-held keyboard unit, and no programming changes are needed to use the devices with most CPUs, terminals and carrier equipment, the spokesman maintained.

Typical Configurations

A typical 3845 or 3846 configuration for computer-to-terminal communication consists of a CPU-3845 or 3846-modem-transmission lines-modem-3845 or 3846-terminal combination, in that sequence, he said.

The Cryptographic Subsystem encrypts data stored on magnetic tape and disk files and is comprised of two software products and one hardware product.

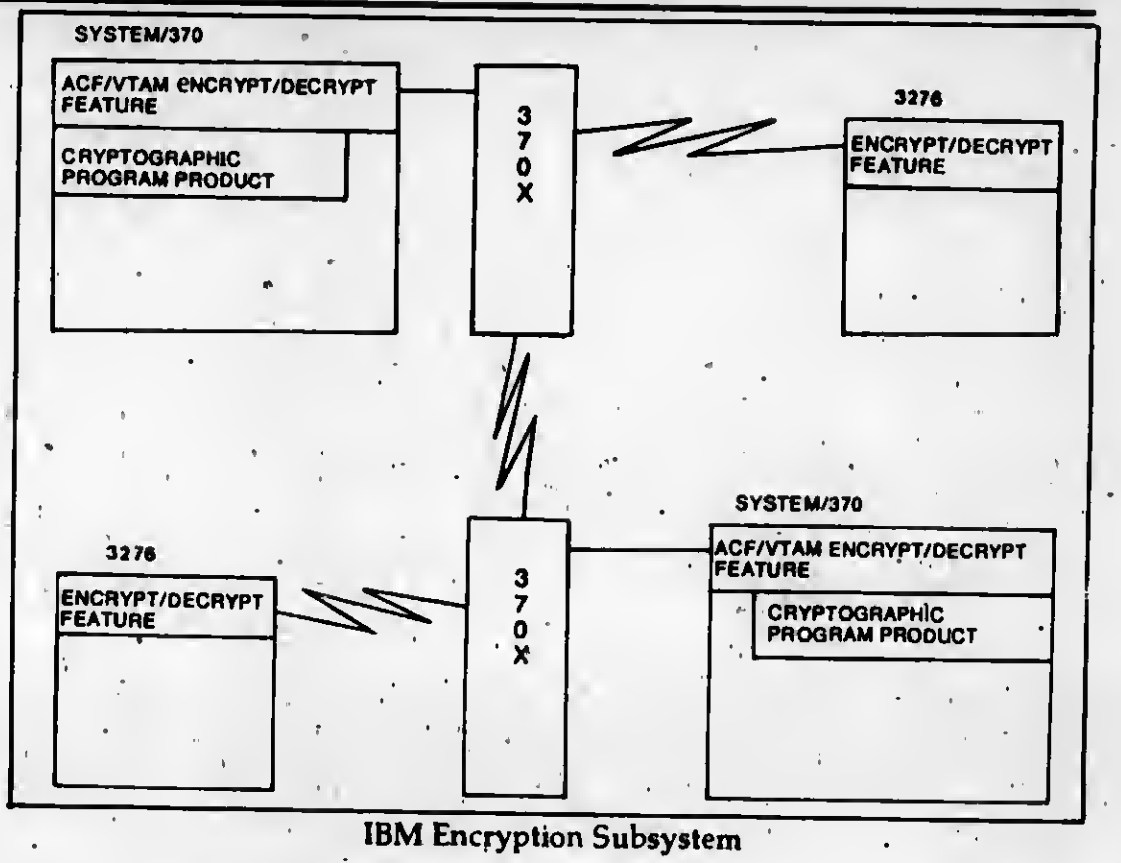
The constituent software products are the Programmed Cryptographic Facility Program and the Advanced Communications Function for Virtual Telecommunications Access Method (ACF/Vtam).

The constituent hardware product is the 3276 control unit display encrypt/decrypt feature.

IBM is not the first vendor to offer encryption file protection for IBM products. Earlier this year, Odyssey Systems, Inc. of Cambridge, Mass., announced a software product called Fortress aimed at 360/370 users and said to employ the same NBS encryption method in protecting source, object and load modules as well as data files [CW, April 11].

The purchase price of Fortress was set well under the announced prices of IBM's encryption products. The unit price of Fortress object code with documentation was set at $975, whereas IBM announced 3845 and 3846 purchase prices ranging from $2,125 to $3,600 per unit — depending on the model selected. The hand-held keyboard unit for use with 3845 and 3846 devices costs $265.

The IBM Programmed Cryptographic Facility Program and the ACF/Vtam encrypt/decrypt feature are available for monthly license fees of $250 and $125 respectively. The terminal encryption/decryption feature costs $1,710 or $42/mo under a two-year lease.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SCDP Honors Taylor

MEMPHIS, Tenn. — The Society of Certified Data Processors (SCDP) has presented its first Founding Father Award to Alan Taylor, citing his "contribution to data processing professionalism."

Taylor, a *Computerworld* columnist, created the SCDP in 1971 with the goal of making it an organization of "legally recognized data processing professionals." Taylor is deeply involved in legal DP issues, the society noted.

As for the future of the award itself, Vice-President Jerry J. Martin said the SCDP will "call it the Taylor award. After all, there are many women members of SCDP and the 'Founding Father' name just won't do at all."

IBM, Justice Brass Huddle

(Continued from Page 1)

said, because he is the highest ranking official in the department who can deal with the case. Attorney General Griffin Bell excused himself from acting on the IBM case because his Georgia law firm represented IBM.

The title of Associate Attorney General was recreated particuarly for Egan, and he is listed as the No. 2 man in the department on organizational charts.

In addition, he is considered the "political czar" of the department, sources said, and would likely be consulted about matters that could have political implications.

Likewise, Cutler — who was described as "brilliant" — might be the "logical person" to conduct settlement negotiations from the IBM viewpoint, antitrust lawyers here indicated. His firm has extremely close ties with Cravath, Swaine & Moore, the firm representing IBM in the case in court, and is well known in Washington legal circles.

Furthermore, the sources indicated the Cravath, Swaine & Moore "settler" who specialized in settling such cases had retired recently.

Not First Powwow

The meeting was not the first between Justice Department officials and IBM attorneys about the case: last January Katzenbach himself met with Donald Baker, then head of the Antitrust Division, in what was reported to be an attempt to outline what IBM would like to see in any settlement of the case [CW, Jan. 17].

Interest may have been renewed in a settlement on the side of IBM, other legal sources indicated last week, because the testimony of Dr. Alan McAdams, the government's chief economist, was stronger than the IBM attorneys had expected.

If IBM loses the government antitrust case, it will be open to treble damage suits from users who could use the government decision as *prima facie* evidence that IBM monopolized the computer market. The users would then only have to prove their damages and would not have to prove IBM monopolization.

On the other hand, the Justice Department may be interested in a settlement, since the IBM case is tying up a great deal of the department's resources, which could be devoted to other matters if the case were ended.

AT&T Asks Curbs on U.S. In Antitrust Evidence Search

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — The Justice Department is improperly trying to obtain evidence in its antitrust suit against AT&T by seeking documents from private antitrust cases involving the firm, AT&T has charged.

The allegation appears in recent pretrial motions filed here shortly after the Supreme Court refused to hear AT&T's argument that the three-year-old antitrust suit against the Bell System should be dismissed [CW, Dec.5].

Asked last week to respond to the charge, a Justice Department official agreed that the government has sought permission to review sealed records from private antitrust suits against AT&T. But he denied that there is anything improper in that tactic.

"If we couldn't use documents from private antitrust cases, we wouldn't go after them," the spokesman explained. He insisted that the Justice Department would be "negligent" if it ignored that evidence.

Access to records of the private antitrust suits brought against the Bell System by Litton Systems, Inc., Wyly Corp. and MCI Communications Corp. would speed up preparation of both the government and AT&T cases. "We want to avoid a situation where the two parties spend years passing relevant documents back and forth between each other" before the trial even begins, the spokesman explained.

In its pretrial motions, filed at U.S. District Court here, AT&T asked Judge Joseph C. Waddy to restrain federal attorneys from seeking evidence from private antitrust suits. Waddy has not yet responded.

To buttress its request, AT&T cited recent appellate court decisions which it claims prohibit the use of such documents.

The Justice Department, however, denies knowledge of any such appellate court rulings, the source replied. In fact, when the issue arose during the Litton case recently, a magistrate in New York City pronounced the practice "sensible and innovative," the Justice Department spokesman reported.

AT&T officials have also accused the government of trying to rush the case to court before AT&T's attorneys have had a chance to prepare an adequate defense.

Company lawyers contend they will need at least four years to ready their case for trial.

The Justice Department admits it favors an early trial date but insists that its only motive in resisting delays is to cut costs, the official said.

Revamp Plan Limits Users' Net Choices

(Continued from Page 1)

areas, the task force said.

Category II covers special communications networks that connect a cutomer's various locations. Under the plan, these special networks could be connected to the nationwide dial-up phone network only through switching equipment such as PBXs at customer locations.

A charge made for this type of connection would allow the telephone companies to recover the value of the service lost because of the traffic on the noncarrier network.

Special nets covered under Category II include those provided by the specialized and other competing carriers.

The key to this provision is that all switching equipment must be within the using company, according to the AT&T spokesman. This would apparently mean, therefore, that a salesman in the field would not be able to use the local dial-up network to access a specialized common carrier used by his company.

Category III covers private communications networks provided by existing or specialized carriers or by the user. Such networks would not be allowed to interconnect with the dial-up facilities and could only communicate with other stations on the same network.

Category IV would allow certain services such as switchboards and phones at customer locations to have direct access to the dial-up network.

Although not entirely clear, it appears that users who access networks through local calls would no longer be able to use such services unless their calls went through a switchboard at one of their own company offices.

This would virtually eliminate the type of service now provided by companies like Telenet Communications Corp., several industry sources said.

Solution to Dilemma

Asked if the new framework were meant as a substitute for the AT&T-fostered Consumer Communications Reform Act, the AT&T spokesman said the Reform Act had been mainly designed to get people to think about the issues while the latest framework is the first step toward finding solutions to the dilemma.

A spokesman for one of the specialized common carriers called the latest move by the telephone industry just another attempt to eliminate the specialized carriers.

Another regulatory expert said the plan "puts everything right back at square one. The telephone industry, after losing the interconnection and specialized carrier battles, will now try to use every legal and regulatory tactic to stall progress, and nobody in government has the guts to stand up to it."

Among the services that would be eliminated if the task force proposal were adopted are off-net Common Control Switching Arrangements (CCSA); FX lines; MCI's Execunet and switched private line service; Sprint, offered by Southern Pacific Communications Co.; and value-added services such as those provided by Telenet.

Although most noncarrier industry groups were studying the proposal last week, the Ad Hoc Committee for Competitive Telecommunication issued a statement that said the task force "seeks the same objectives as the Bell Bill under the guise of compromise."

In a letter sent to members of Congress, the group said the Bell Bill "would have eliminated competition by a single stroke. The new proposal would starve us out of existence.'

The proposal would severely curtail the services that competing carriers are now allowed to provide, an industry source said.

It would also eliminate important money-saving services from the telephone companies that business users need, he added.

The House Subcommittee on Communications will begin drafting legislation in January to update the Communications Act; the legislation is expected to be introduced into Congress about Easter.

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Justice, FTC Oppose Antitrust Review Bill

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The Justice Department and the Federal Trade Commission (FTC) joined forces here last week to oppose legislation that would create a special commission to conduct a comprehensive study of competition in the U.S. economy.

Sponsored by Rep. Morris K. Udall (D-Ariz.) and 40 others, H.R. 6098 would mandate a broad review of all the factors contributing to increasing industrial concentration and the threats bigness in business poses to the free enterprise system (see story on Page 8).

"I do not believe the general study of competition or the antitrust laws contemplated by this proposed legislation is either necessary at this time or likely to result in the kind of report that would prove useful," John H. Shenefield, Justice's assistant attorney general for antitrust, told the House Monopolies and Commercial Law Subcommittee during hearings on the Competition Review Act of 1977.

The proposed study is "entirely too broad and ambitious," Shenefield contended. He is worried the three-year commission would take staff and resources from the already hard-pressed antitrust enforcement agencies.

The antitrust chief favors the approach President Carter took recently in setting up a commission that will study two topics in six months — antitrust exemptions and how to handle complex cases.

FTC Chairman Michael Pertschuk said his agency supports the purposes of the bill, but added there are "several possible disadvantages that give us concern."

A commission of the kind Udall has proposed might be used as an excuse to frustrate ongoing enforcement activities, Pertschuk noted. Several of the industries the bill would have the commission examine are already the subject of FTC investigations.

Washington Update

Senate Starts Shuffle After McClellan Death

The recent death of Sen. John L. McClellan (D-Ark.) has precipitated leadership shuffles in several key senate committees that affect computers and communications issues.

McClellan, who headed the powerful Senate Appropriations Committee, will be replaced by Sen. Warren D. Magnuson (D-Wash.), Capitol Hill sources agree. This promotion for Magnuson will mean a vacancy chairmanship in the Senate Commerce Committee, home of the Subcommittee on Communications.

The senator considered the most likely choice to head the Commerce Committee is Howard W. Cannon (D-Nev.), sources said. As head of the Senate Rules Committee, which governs the Senate's own computer operations, Cannon is familiar with computer and communications issues, and no one contacted by *Computerworld* expects the direction of the Commerce Committee or its Communications Subcommittee to change under Cannon.

The slot is expected to be filled by Sen. Claiborne Pell (D-R.I.).

Pell sat on the Rules Committee as one of its members, but sources agree he is the "unknown quantity" in the Magnuson-Cannon-Pell triad.

VA Moves on Target, Picks HIS as Supplier

With a congressional go-ahead and $18.4 million in hand for fiscal year 1978, the Veterans Administration (VA) has selected Honeywell Information Systems, Inc. to install its controversial Target computer system nationwide.

Intended to process veterans compensation, pension and education benefit claims, Target drew considerable fire from members of Congress over the summer [CW, Aug. 1].

Under Target, VA regional offices in 56 locations across the U.S. and in Puerto Rico will communicate on-line via satellite, minicomputers and CRT terminals to large-scale host computers in three regional DP centers. These regional host systems will, in turn, communicate with a central host system containing master files, according to Max Cleland, VA administrator.

A dual Model 66/80 large-scale system at HIS' manufacturing site in Phoenix will initially be used for conversion and testing. A dual Model 66/60 will be installed next May in Hines, Ill., to serve as the host for the distributed system, an HIS spokesman said.

Dual Model 66/80 systems will be installed at VA regional DP centers in Hines, Los Angeles and Philadelphia. Each center will serve approximately 20 regional offices.

Equipment in these offices will vary depending on the size of the facility, ranging from one to four Model 6/37 minicomputers, from 10 to 137 Model 7760 CRT terminals and from seven to 32 Rosy-26 advanced model serial printers.

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To Speed Cases Like IBM, AT&T

Carter Creates Group to Eye Antitrust Process

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter has ordered a commission into existence to deal with the problems created by large antitrust cases such as those involving IBM and AT&T.

The commission will work from the assumption that the antitrust laws are what they should be, but that procedures need to be developed to allow these laws to work more effectively through the Justice Department's Antitrust Division, the Federal Trade Commission (FTC) and the courts, a Justice Department spokesman said.

Given a life of six months from the time the last of its 15 members is appointed by the President, the commission will examine how to make the big cases run to conclusion more smoothly and expeditiously, he said.

In addition, the commissioners will look at the exemptions and immunities now provided by the Sherman and Clayton antitrust acts.

As recommended to Carter by the Justice Department, six of the commissioners will be from Congress and five from the private sector.

The remaining four members will be Assistant Attorney General John Shenefield, FTC Chairman Michael Pertschuk, one of the chairmen from such independent regulatory agencies as the Civil Aeronautics Board or the Federal Communications Commission and a federal district court judge.

The antitrust commission will not delve into cases currently in litigation, the Justice Department spokesman stressed. At most, suits like U.S. vs. IBM and U.S. vs. AT&T will serve as case studies on the course taken by large antitrust cases.

Reflects Bell's Concern

The Justice Department's suggestion to the President that he create such a commission is a reflection of the attention Attorney General Griffin B. Bell wants placed on the big cases, the spokesman said.

Since an interview with *Fortune* magazine in which Bell suggested that the government's case against AT&T was the kind he might send to Congress, Bell has said he never intended to take the suit against AT&T out of the courts [CW, Sept. 19].

In a recent interview in the Bureau of National Affairs' *Antitrust and Trade Regulation Report*, Bell reiterated that he will take "no existing cases to Congress." He told the bureau that it is his style to provoke discussion of an issue, that he was "merely speculating on possibilities for the future."

Bell's speculation has provoked considerable discussion on Capitol Hill and in private legal circles.

Many fail to understand how Congress can be involved in the trial of antitrust matters. "If Bell is proposing a trial in the sense that we normally think of trials, I don't see how it can happen," a staff member for the Senate Antitrust and Monopoly Subcommittee said.

"Trial by Congress" sounds unconstitutional, another Senate source stated. "The antitrust laws are clear enough, and by passing them Congress has already been involved in large cases."

Bogged down in proposed legislation calling for divestiture of the oil companies, airline and trucking reform and ways to deal with conglomerate mergers, the Senate Antitrust, and Monopoly Subcommittee hasn't had time to look into the handling of large antitrust cases, he said.

Hart Bill Reincarnated

On the House side, a bill has been introduced that would establish a special commission to conduct a comprehensive review of the state of competition in the U.S. economy.

Called the Competition Review Act of 1977, H.R. 6098 would examine many of the same subjects the late Senator Philip Hart (D-Mich.) studied in his efforts to break up industrial concentrations, a Capitol Hill source said.

Neither Bell's suggestion nor the proposed competition act is "really very new," a House Judiciary Committee staff member said. "Where industries have [messed] up in the past — public utilities, banking, railroads, securities — they've been reorganized by Congress.

"Congress has done the groundwork for its role in industrial restructuring — look at all the Hart hearings, for example," the staffer added. "Right now we're rewriting the Communications Act of 1934, and look at all the bills on the hill for divesting the oil industry."

A Washington, D.C., attorney and consultant on communications law and regulatory policy, John Eger, also sees the continuation of an old debate in Bell's suggestion of congressional involvement in restructuring.

Eger, who previously served as principal advisor for telecommunications to President Ford and as acting director of the White House Office of Telecommunications Policy, said congressional participation in structural questions might have been resolved during the Nixon-Ford White House days had Hart's proposed act been a little less stringent.

Having succeeded Hart as chairman of the Senate Antitrust and Monopoly Subcommittee, Sen. Edward Kennedy (D-Mass.) believes, as the Attorney General does, that large antitrust cases need to be expedited, Eger stated.

Because of his political savvy, Kennedy might succeed where Hart failed, Eger indicated. He believes, too, that Bell's suggestions that large antitrust cases be handled in part by Congress is in accord with Hart's proposals.

Hart and those who have come after him essentially would spin off those issues dealing with restructuring to Congress while leaving the actual antitrust case intact for trial by the courts, Eger said.

Large corporations would then bear the burden of proving to the courts that one or the other of these federal agencies acted capriciously in proposing structural reform, he suggested.

Congress would legislate a minimum standard — market share, for example — and permit the FTC and the Justice Department to propose structural reforms for particular industries.

Congress would not "try" the corporation. The legislature would set up a red flag that would fly when a par-

(Continued on Page 10)

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French Bill Seeks Data Protection Commission

Special to Computerworld

PARIS — When the French government sent its privacy bill to the parliament here last summer, like most European governments it proposed a set of rules and regulations that would be enforced by a 12-member national commission on data processing and freedom.

However, the government-proposed bill has already been modified considerably by both the senate and the national assembly (see related story on Page 11) and what the law will look like by year's end is anybody's guess.

The bill called for the commission's responsibilities to include "informing all persons concerned of their rights and obligations; by consulting with them and supervising the application of computer techniques to the processing of personal data."

The act would apply to both public and private organizations using DP techniques. Personal data was defined to include any information "which permits the identification, directly or otherwise of the public or private legal persons to which it relates."

One of the salient features of this bill instructed administrators and judicial officers that: "No judicial or administrative decision implying a judgment on human behavior shall be based solely on data processed by automated devices" [Article 2].

Public authorities would need permission to process personal information and private entities would be required to submit a "declaration" to the commission "containing an assurance that the processing satisfied the requirements of the act." Under the terms of the bill, a fee to cover the cost of the commission's services could be levied on organizations making declarations.

Contents of Declarations

Declarations would have to contain a number of specific details, such as the name of the person responsible for the system, the purpose and characteristics of the data processed and the office where persons may access their files. In addition, it would have to list the categories of persons who have direct access to the recorded data, what interconnection or secondary uses are performed with the data and security measures taken to protect the integrity and confidentiality of the data.

The commission would be empowered to conduct on-the-spot inspections, compel the production of necessary documents, decide the degree of "risk of encroachment to private life or freedom" present in any system, impose special security requirements and receive claims, petitions and complaints.

Processing of personal data carried out in France for transmission abroad would be subject to the same declarations as data processed for domestic use. However, data processed outside France "may be made subject to prior authorization or to rules defined by the Council of State, to ensure the provisions of the act are respected," the bill specified.

The legislation set forth rules on collection and storage of data, procedures for access to personal files and penalties for violations:

- Persons from whom personal data is obtained shall be informed of the compulsory or optional nature of replies, of the consequences for failure to reply and of the identity of the individuals or corporate bodies which receive the data.
- Except where expressly provided, personal data shall be stored for only as long as necessary in view of the purpose for which it was collected.
- Persons must consent to the recording of data which reveals racial origins, political, philosophical or religious opinions or affiliation in trade unions. An exception is made for churches, political parties and trade unions to collect such data on their members but within limits of "the public interest."
- Persons may have access to all data concerning them by applying to the organization maintaining it. A copy must be made available for a fee, and any information which is inaccurate, incomplete or misleading must be corrected, completed, clarified or obliterated. Data in the hands of the police or security agencies is exempted.
- Imprisonment for up to five years and fines ranging from $5,000 to $200,000 may be applied to anyone convicted of violating collection, maintenance and disclosure provisions.

Once adopted, the law would become effective within three years. The public sector would be regulated first, with all authorities having personal records filing "simple declarations" of their existence.

Once the commission is operational, steps would be taken by the council of state to activate regulations for private organizations.

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First German Privacy Trial Involves Mail-Order Data

Special to CW

BAD KREUZNACH, Germany — The prosecutor here has presented charges in the local court against four persons who allegedly violated the state of Rhineland-Pfaltz data protection law. This is the first litigation over a privacy statute in Germany, according to the *Frankfurter Algemene Zeitung*.

The case involves a 31-year-old student who allegedly obtained and used in an unauthorized manner information protected by the privacy law. Another defendant and his associates who operate a mail-order gift catalog firm are said to have persuaded and paid the student to turn over documents containing the names and addresses of 11,355 citizens residing in this area.

The student allegedly secured a list of names collected for use in an academic research project from a government office. But he apparently sold them for 1,500DM ($600) to the mail-order firm. Earlier, the same student is alleged to have passed another sizeable list to the company, this time for 8,000DM($3,500).

The defendants live in the state of Baden-Wurtenberg, which has no data protection law. However, they used data from this community and were apprehended here, so charges can be pressed against them. Once the Federal Data Protection Act becomes effective on Jan. 1, either national or state laws can be used to prosecute those who abuse personal records in Germany.

Group to Eye Antitrust Process

(Continued from Page 8)

ticular industry became too concentrated in the hands of one or a few corporations. The House and Senate would also empower the Justice Department and the FTC to do something about that concentration of power, Eger explained.

In the end, the courts would still judge whether companies within an industry should be divested.

Rather than let the Justice Department and the FTC propose structural reforms, Hart would have created an agency — the Industrial Reorganization Commission — which would have had few restraints to its power. From the Ford Administration's viewpoint, this was a major drawback of the bill, Eger stated.

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Passage Expected by Year-End

French Parliament Ending Privacy Law Debate

Special to CW

PARIS – The French parliament is nearing completion of a major data processing and privacy law that will have important domestic ramifications and also may affect legislation pending in other European countries.

On Nov. 18, the senate voted to accept most of the provisions of the Data Processing and Freedom Act voted by the national assembly on Oct. 5. Both chambers must now iron out differences before final enactment, expected by the end of the year.

The senate notably strengthened the national commission established under the law. This was done by broadening its membership from 12 to 16 to include four parlimentarians and a journalist and through giving it an independent administrative authority.

The senate also recognized the international implications of protection of personal data. The official senate report invited the government to collaborate on an international convention prompted by "its concern for the protection of the individual and the need to grasp data processing realities."

In the national assembly, a controversy erupted between the parties of the government and the opposition, a left-wing coalition of Socialists and Communists. The Socialist spokesman began the debate by calling the government bill an "improvement which we will probably support." However, when the debate ended there were 289 votes in favor to 176 against, mostly Socialists and Communists.

The 153 amendments tabled before the bill commenced debate were a sign of a brewing conflict. The Socialists and Communists proposed major revisions:

- Extending the coverage to all manual files.

Abolishing any distinction between private and public data banks.

- Giving citizens "participation" in the creation of data banks.
- Requiring the election of members of the commission and creating regional bodies.
- Abolishing the exemption of the press to a collect and maintain personal data.

On the issue of the manual systems, a compromise was reached to the effect that when a public manual file presents a danger to liberty, the government, on the advice of the commission, can subject it to the provisions that apply to automated files.

The minister of justice estimated that the legislation would affect 125,000 automated systems and he speculated that extending the measure to manual files would raise the number to tens of millions which, he said, "is unreasonable."

The other amendments proposed by the left-wing coalition were defeated, resulting in its opposition to the bill..

National Assembly Amendments

Observers were surprised that the assembly dropped the word "freedom" from the proposed name of the commission, implying that a much greater interest exists in controlling data processing activities. Anxiety was enhanced by an amendment that widened the definition of personal data processing to "every operation relative to the constitution, elaboration, storage, modification, communication or destruction of personal information" [Article 11].

However, the assembly did vote for a provision to allow private-sector data banks to be registered by means of a "simple declaration" for routine systems. A new provision was included to prevent the collection of information which is fraudulently or illegally obtained.

While the assembly voted down a proposal to publicize the decision-making process of the commission, a provision requiring the commission to provide details about its procedures in an annual report was retained.

Extra Task

An additional task for the commission will be to act as a warning panel to the council of state on matters regarding transborder data. Keepers of data banks, public and private, will be required to help the commission in carrying out its duties.

Another responsibility placed on personal recordkeepers is to correct records on their own initiative as soon as they learn that files are incorrect or incomplete in any way. When information has been transferred to a third party, their correction or deletion, according to an amendment, must be transmitted to such secondary recipients.

The commission can issue exemptions from this duty.

Action Tomorrow

The French national assembly is scheduled to take up the senate-passed DP and liberty legislation on Dec. 13. The major issue for the government is whether to oppose or let pass the enlarged membership of the national commission and its independent status, which were major modifications made by the senate.

If the assembly fails to adopt the senate-passed text, a special committee of the assembly and senate would be appointed to negotiate the differences – a procedure that is similar to U.S. congressional procedure.

The significance of an assembly fight and delay in passage of the legislation would probably be no law at all until after the March parliamentary elections.

This would cast privacy into the election campaign with the left-wing parties claiming government failure in this field and socialist-communist endorsement of an even stronger measure when the new parliament convenes in 1978.

French Press Reacts

PARIS – Responses by the press to passage of a data protection act in both houses of the French parliament was mixed.

An analysis by *Le Monde* columnist Phillipe Boucher called the legislation passed by the assembly "late and already outdated."

In his assessment, Boucher complained of the naivete of the assembly in not including manual files. He noted that certain companies have seen this loophole and are moving their sensitive data into manual routines.

Even though the law is "not reassuring in its details," he said he believes it makes the computer industry uneasy because the French law, unlike proposals in a number of countries, extends the right of access to legal persons, among them commercial entities.

There is said to be a concern that this may have the effect of scaring some companies from France, he concluded.

The senate revisions should receive more favorable press and business reaction. *Le Figaro*, a leading Paris newspaper, observed, "The senators wished to ensure better protection and less constraints for users of data."

Transborder Data Meet Set

BRUSSELS – The increase in transnational data traffic has set several governments to work on preliminary regulatory plans, and as a result, barriers to computerized data moving across national frontiers are being erected under the names of privacy, data security, sovereignty or the protection of domestic data processing.

On Feb. 7-9, On-Line Conferences of Uxbridge, England, will present an international conference on the subject. Speakers will be drawn from the Public Telephone and Telegraphs, the international organizations, private carriers, teleprocessors, data processors, manufacturers, suppliers and users from Europe and North America.

Jan Freese, director-general of the Swedish data inspection board, will chair the conference.

Speakers will include A.A. Benjamin, director-general, Computing Services Association, London; F.A. Bernasconi, director-general, IBI, Rome; Prof. J. Bing, Norwegian Research Center for Computers and Law, Oslo University; and John Eger, communications attorney and former acting director of the White House Office of Telecommunications Policy.

For further information, contact Al Dunn, On-Line Conferences, Cleveland Road, Uxbridge, Middlesex, England UB8 2DD; Telephone: Uxbridge 39262.

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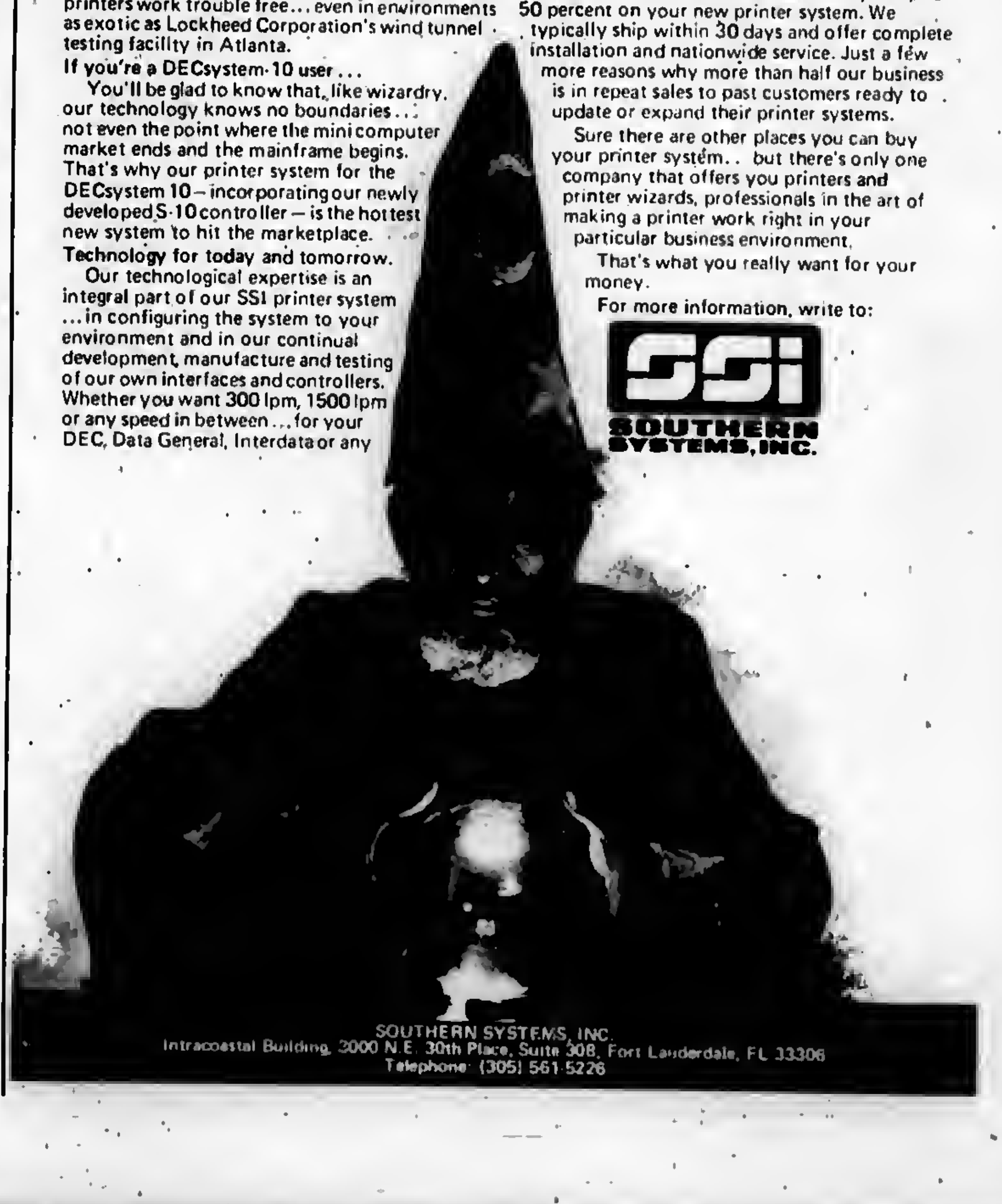

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DOD Joins Critics of Proposed I/O Standard

By Molly Upton
CW Staff

WASHINGTON, D.C. — Add another voice to the din of dissent being heard by the National Bureau of Standards (NBS) over the proposed changes in the implementation section of the drafted I/O channel level interface standard.

In a recent memorandum, the Department of Defense (DOD) called the original December 1976 proposal "a very significant, important and reasonable step forward into the virgin territory of interface standards."

"Step Backward"

The August compromise revision, is however, "a very big step backward. The attempt to satisfy everybody may well result in satisfying nobody," according to John M. Carabello, director for data automation, management systems, in the Office of the Assistant Secretary of Defense.

In his memo to Harry S. White Jr., associate director of DP standards at NBS' Institute for Computer Sciences and Technology, Carabello acknowledged one of the issues frequently raised in discussions of I/O interface standards is that they would restrict competitive procurement because some systems manufacturers with different interface schemes would be excluded.

But Carabello called this argument "rhetoric" and pointed out there is specific technical evidence to the contrary.

Component Approach

"Are we talking about competition between bundled systems or competition between system components procured for assembly into a system? The latter orientation is where the greatest opportunity lies for stimulation of technology and competitive dollar savings," he said.

Further, he said, "the August revision has put in unreasonable technical specifications, e.g., one to four standard interfaces that may not be used, and has introduced ambiguity to such an extent that compliance can be easily circumvented and enforcement made impractical.

"The current proposal can do little more than pay lip service to the requirement for I/O interface standards," Carabello stated.

Sterile Proposal

DOD is reluctant not to oppose the revision because to do so would add time to the standardization process, but "in this case we are left no choice since the current proposal will be sterile."

DOD "strongly recommends returning to the December proposal and its prompt issuance as a mandatory standard. Only then will true technical specifics be identified and addressed for improvements," Carabello stated.

The DOD joined Norman Ream, formerly with NBS (see Page 69), Rep. Jack Brooks and the Computer & Communications Industry Association in objecting to the revised implementation section of the proposed federal standard.

Other respondents to NBS proposal have included Honeywell, Control Data Corp., Burroughs, IBM and the Computer and Business Equipment Manufacturers Association.

Simulation Group Increases Grant To $6,000

TAMPA, Fla. — The grant to develop tools, techniques and applications of computer simulation scheduled to be awarded at the Eleventh Annual Simulation Symposium will be $6,000 rather than the $4,000 originally announced.

This increase was made possible through a contribution by Interdata, a unit of Perkins-Elmer Data Systems, a spokesman said.

More information on the symposium, slated for March 15-17 here, is available from Victor P. Boyd, U.S. Postal Service, 2009 Powhatan St., Falls Church, Va. 22043.

Correction

In "IEEE Picks Getting" [CW, Nov. 21], vote counts were incorrectly reported. Ivan A. Getting received 28,161 votes and Irwin Feerst received 21,753.

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For Patient, Professional Benefits

OTA Urges U.S. Stand on Medical Information

By Edith Holmes
CW Staff

WASHINGTON, D.C. – The Office of Technology Assessment (OTA) recently urged Congress to develop a federal policy toward medical information systems before their numbers increase to the point where standardization, to maximize patient care benefits and minimize risks to individual privacy, can no longer be achieved.

The report, "Policy Implications of Medical Information Systems," suggested to Congress that automated patient treatment records could provide substantial assistance to the health professions in the face of rising demands for complete and accurate data.

Not only might such systems affect the quality, cost and efficiency of medical care by improving coordination and communication in hospitals; they could also help physicians by providing access to detailed treatment information and the latest medical knowledge, OTA said.

At the same time, one of the implications of medical information systems that must be faced is how confidential patient records can remain within them, the congressional office warned.

"Today, computer records are more secure than manual records. However, medical information systems are not widespread, and problems potentially could arise," the OTA report stated.

Recommended Actions

The office proposed that federal policy actions in a number of areas might take place simultaneously. To help ensure that the benefits of medical information systems are retained while individual privacy is protected, the report suggested that the federal government:

- Establish a central clearing house to coordinate developmental projects and provide information to the public about medical information systems.
- Provide funding for evaluation of medical information systems in a number of different medical care facilities to determine their effectiveness in terms of relative benefits and costs.
- Ensure the availability of medical information systems with specified capabilities by contracting for their design and development.
- Provide incentives for medical care facilities to adopt medical information systems that improve the quality of patient care and support research and planning.
- Authorize a central organization to develop, validate and maintain the content of medical knowledge within medical data systems.
- Develop standardized medical data bases, including nomenclature, terms, definitions, classifications and codes for use in medical information systems.
- Establish guidelines for precise standards to protect confidentiality of patient data within an institution and release of identified data to third parties.

Until now, the open marketplace has determined the kind and quality of medical information systems available, OTA said. Only the National Center for Health Service Research within the Department of Health, Education and Welfare has supported research on these systems through grants and contracts to independent investigators.

Without further federal involvement, OTA fears that research to heighten computer capabilities for improving and monitoring the quality and planning of medical care will go undeveloped, causing the loss of potential benefits to patients and the medical care system.

Focusing on three existing medical information systems, the 73-page report identified benefits and limitations accompanying these applications of computer technology. The three systems studied were Technicon's Medical Information System (TMIS) in the acute care El Camino Hospital in Mountain View, Calif.; the Computer-Stored Ambulatory Record (Costar) system at the Harvard Community Health Plan, an ambulatory care facility in Boston; and the Problem-Oriented Medical Information System (Promis) at the University of Vermont Medical Center.

Few medical units have these systems because they are so expensive, OTA reported. "Medical information systems cost about double the current average expenditure for the financial and management computer applications they replace," the study said.

"Operating costs for a hospital-based medical information system range from $4 to $9 per patient-day or from 4% to 7% of the total hospital operating budget," OTA stated.

While medical information systems are an expensive technology, many of the organizations using them reported considerable cost savings to OTA, "particularly in labor expenses." These institutions attributed savings in other areas such as the elimination of printed forms and reductions in "lost charges," in addition to reductions in clerical, admissions and nursing staff, the report said.

Copies of the report, No. 052-003-0046-8, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 at $2.50.

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Datacomm 78 to Air World Data Flow Issues

By Tim Scannell

CW Staff

WASHINGTON, D.C. — The future licensing of computer data bases and other problems resulting from restrictive laws governing the flow of data among nations will be among the topics discussed at Datacomm 78, a conference to be held at the Sheraton Park Hotel here on Feb. 21-23.

"Crucial Junctions in World Communications" will cover information technology and its impact on world politics and present proposals currently before Congress for the restructuring of international communications policies, a spokesman for Datacomm said. The role that the data communications industry can play in affecting these proposals will also be discussed, he added.

Speakers will concentrate on laws passed by individual nations that deal with privacy, security and the licensing of data bases and will focus on the problems that multinational corporations face in building international data communications networks.

Speakers include John Eger, former director of the White House Office of Telecommunications Policy; Oswald Ganley, Deputy Assistant Secretary of State; Walter Hinchman, chief of the Federal Communications Commission's (FCC) Common Carrier Bureau; Hugh P. Donaghue, vice-president of Control Data Corp.; and William J. Durka, manager of international legislative and trade policy for General Electric Co.

Other topics will include data communications network architecture, network security and software and product trends in areas such as modems, multiplexers, data entry and distributed processing terminal hardware, the spokesman said.

Registration fees for the conference are $50 per day or $115 for the entire three-day meeting. Details on program topics and registration materials are available from the Datacomm program director at the Conference Co., 60 Austin St., Newton, Mass. 02160.

Michelson Award Unbestowed This Year

By Don Leavitt

CW Staff

WASHINGTON, D.C. — There was no presentation of the A.A. Michelson Award at this year's annual meeting of the Computer Measurement Group (CMG) here, but not because there weren't individuals who deserved it.

No award was made because none of them was nominated, according to outgoing group president Donald R. Deese.

The award was established in 1974 to recognize significant contributions to the field of computer performance evaluation (CPE). Although CMG sponsors the award, it has always depended on input to the selection process from other groups and individuals, Deese explained.

That dependence has been deliberate in order to ensure the award doesn't become "an 'in-group' thing," But people outside the selection committee apparently didn't recognize the importance of their part this year and very few nominations were received.

None of the nominees had the stature of the previous Michelson Award winners — Kenneth Kolence, Thomas Bell and Philip Kiviat — so the screening committee decided to omit the award this year.

Travel Service Offered for NCC

MONTVALE, N.J. — Sponsors of the 1978 National Computer Conference scheduled for June 5-8 in Anaheim, Calif., have announced a travel service to assist people going to the event from outside the state.

The travel service will offer a discount on air transportation, personal attention upon arrival at Los Angeles International Airport, assistance at the conference site and help in coordinating air and ground travel arrangements, a spokesman said.

NCC '78 will feature an exhibit program with more than 300 organizations occupying more than 1,100 booths, approximately 100 lecture sessions, a Personal Computing Festival, tutorial seminars and a variety of special activities, a spokesman for the American Federation of Information Processing Societies (Afips) said.

Information and registration materials are available from Afips headquarters, 210 Summit Ave., Montvale, N.J. 07645.

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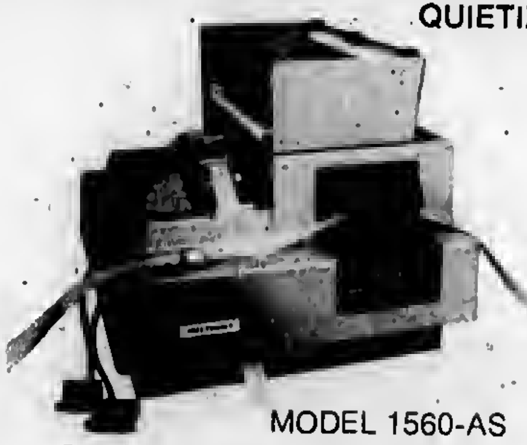

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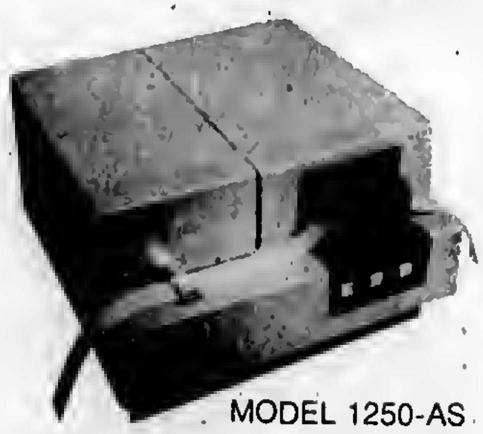

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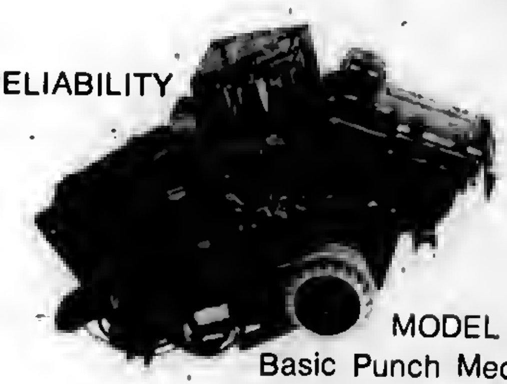

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A LOOK INSIDE NCIC

By Daniel R. Kashey

National Crime Information Center Statistics

Item/Action	December 1967	December 1968	December 1969	December 1970	December 1971	June 1972	June 1973	June 1974	December 1975	June 1976	July 1977
Control Terminals	15		85		102	**97**	**90**	**86**			
Computer Interfaces	2		17		48	50	56	58			
Agencies On-Line			1,500+		4,000+	8,000+	8,000+				
Active Records	346,124	743,950	1,447,148	2,453,662	3,330,220	3,767,107	4,431,052	4,829,150	5,494,655	8,172,217	**6,684,577**
Wanted Persons	18,876	30,082	50,913	77,118	114,497	**114,306**	134,899	147,244	157,268	**148,067**	**132,690**
Stolen Vehicles	130,304	246,640	393,156	584,894	755,879	790,209	824,418	889,600	**805,431**	854,389	908,493
License Plates	31,118	81,800	148,619	208,352	252,735	**238,067**	278,399	**273,585**	**268,162**	325,379	324,957
Stolen Firearms	121,245	191,371	254,085	343,220	441,591	498,082	611,912	734,552	970,801	1,021,670	1,197,953
Stolen Articles	44,781	141,107	319,763	513,373	715,444	707,732	795,213	918,585	**846,609**	1,164,218	1,178,683
Stolen Securities		52,950	281,554	724,326	1,045,629	1,250,633	1,414,700	**1,264,991**	1,882,445	**1,777,881**	1,856,390
Stolen Boats			858	2,379	4,445	5,768	7,372	9,879	11,981	12,931	14,335
New Entries		923,000	1,351,095	1,632,749	1,887,564						
Record Removals		400,036	541,348	580,418	664,148						
Queries (Inquiries)		3,274,688	7,844,870	11,515,851	14,364,308						
Other Transactions		2,427,373	3,849,267	5,901,217	8,167,063						
Total Transactions		7,025,047	13,586,380	19,630,233	25,103,063				87,553,340*	74,066,604*	96,819,932*
Transactions (Daily Average)		19,194	37,223	53,781	88,778	90,000+	106,000+	148,000	181,595	227,373	259,731
Yearly 'Hits'							17,000+				
'Hits' (Daily Average)		275			700	750	900				
CCH Records							317,364	400,000	748,953	859,090	1,053,896
Missing Persons									4,965	10,802	18,980

* Monthly figure multiplied by 12.

Figures in bold denote a decrease from the previous period.

The National Crime Information Center (NCIC) is a compterized data storage and retrieval system currently serving law enforcement agencies in the continental U.S., Alaska, Hawaii, Canada and the Commonwealth of Puerto Rico.

Located in Washington, D.C., NCIC is operated by the Federal Bureau of Investigation. The FBI maintains the system and the systems files while the user agencies maintain the remote access "control terminals" and interfaced computer systems.

In addition, the FBI also has the responsibility of maintaining the data circuits connecting the remote entry locations to the central computer.

When NCIC began its operation in January 1967, it functioned on a two-hour workday. At its inception, 15 law enforcement agencies and one FBI field office were all that had access to the data system during this period of testing and experimentation.

The five original files — wanted persons and stolen automobiles, license plates, articles and weapons — formed a data base of 23,000 initial entries.

Law enforcement and its related computer technological functions of 1967 were somewhat antiquated when compared with today's methods and systems. The initial computer was an IBM 360/40 with 128K bytes of core memory that used Model 2311 disk drives for additional storage (wanted records are stored here) and Model 2702 transmission control units for communications management.

> *The Federal Bureau of Investigation's National Crime Information Center (NCIC) is the largest automated criminal justice data base in the U.S. Users see it as an investigative tool with many different methods of access and numerous uses.*
>
> *Others, such as the computer operations people who enter queries, change tapes, sort files and schedule maintenance, carry out their tasks without ever seeing the end results, be they productive or fruitless.*
>
> *The police officer on the beat and the nontechnical person working in police information systems should know what the other is doing, how he is doing it and why. It is for these people that this article was written.*

One year later, when the vehicle file was expanded and a stolen securities file added, the Model 40 was replaced with a larger 360/50 with 512K bytes of core. The 2311 disk units were replaced by bigger 2314s and more advanced 2703s took over the transmission control functions.

Initial communications were handled by over 5,000 miles of 150 bit/sec line. Today, 2,400 bit/sec lines connect NCIC to nine regionally located multiplexers. From these regional switch centers, some 150 bit/sec lines are still connected to a few original terminals, while all interfaces (direct computer-to-computer connections) and most terminals are now equipped with the faster 2,400 bit/sec lines.

The central computer performs several operations. It controls the transmission of messages both to and from itself, selects memory locations and stores records and processes inquiries and tests to ascertain whether similar information is already in storage if the test is positive, a "hit" results.

Each file contains information of a similar nature (persons, guns, etc). Each item stored, known as a record, is indexed by a number or group of numbers.

Unfortunately, each record does not have a unique identifying number. In the file of wanted persons, a name may be located under a Social Security

(Continued on Page 16)

(Continued from Page 15)

Number, a date of birth, a driver's license number or any other number which accompanied the name when it was entered or revised after entry. It is not the type of number, but the number itself which indirectly leads the program to a storage location.

A great deal of duplication exists in the areas of persons, guns, articles, boats and securities. One number may identify several different persons or articles. A simple example is several wanted persons entered with only dates of birth that are identical. A driver's license number of an individual in one state may be *numerically* identical to the Social Security Number or military service number of a person in another.

The situation is really compounded if similar names are entered with *numerically* identical identifiers. Because the machine cannot distinguish between the two, good old-fashioned leg work once again becomes extremely important.

A descriptive example is the serial number C24680246A. It may appear on several denominations of U.S. currency and on several series within the denominations. Another is the number 32961, which could be the serial number of a Colt Cobra .38 caliber revolver as well as that of a Winchester Model 73 rifle.

In actuality, an officer may request information from NCIC on a weapon with a serial number. The reply (if it is not negative) when displayed on the terminal operator's screen contains all data on all weapons stored in the computer under that number. The investigating officer must then proceed to eliminate those which are not the same make and model as the questioned item.

Serious problems arise when weapon manufacturers make several models without distinguishing model numbers and serial numbers are duplicated. Should these be entered into NCIC, the record appears to show two or more identical weapons stolen or missing, possibly at different times and from different locations.

A reply of several weapons entered from various parts of the country, all with the same brand name and serial number, can be both very frustrating and time-consuming.

More Precision

Greater precision exists in the vehicle and license plate files. American automobile serial numbers, referred to as vehicle identification numbers (VIN), are now practically unique, but ambiguity could occur with older vehicles and imported autos.

License plate numbers can be unique if a state and year of registration are included in entries and requests. In most cases, a license plate number will not be accepted for entry without this additional information.

In addition to stolen and wanted items, many missing, found and recovered articles, after being processed and not found on file, are stored. This is valuable when, for example, an automobile is recovered in one jurisdiction and checked through NCIC before the owner reports the loss in a different jurisdiction.

A license plate found in one state may be entered because it may later be of interest to an agency in another. For example, at a later date it might be identified as having been involved in an earlier crime. The same is true about lost or stolen personal identification which could later be used to falsify identity for criminal purposes.

Helpful Information

To facilitate these operations, each entry and request contains, in addition to the article and identifying number(s), an originating agency identifier (ORI). The ORI is a unique number which identifies the transmitting police agency.

Also included is an originating case number (OCA), which is a number used by that agency in its filing system to identify the case or investigation which involves the questioned item or person. Should an agency receive a hit on an inquiry, the reply contains the ORI and OCA of the police agency that originally entered the record.

Additionally, the originating agency is notified by NCIC that someone (the ORI of the inquiring agency) had inquired about one of its entered records. The two agencies must then follow up by telephone, teletypewriter or in person.

Why are all of these identifying numbers necessary? Imagine receiving a reply that the automobile you have inquired about is stolen, but not being told by whom it was reported. Further, if you are told it has been stolen in and reported by a large police agency such as New York City, imagine how you

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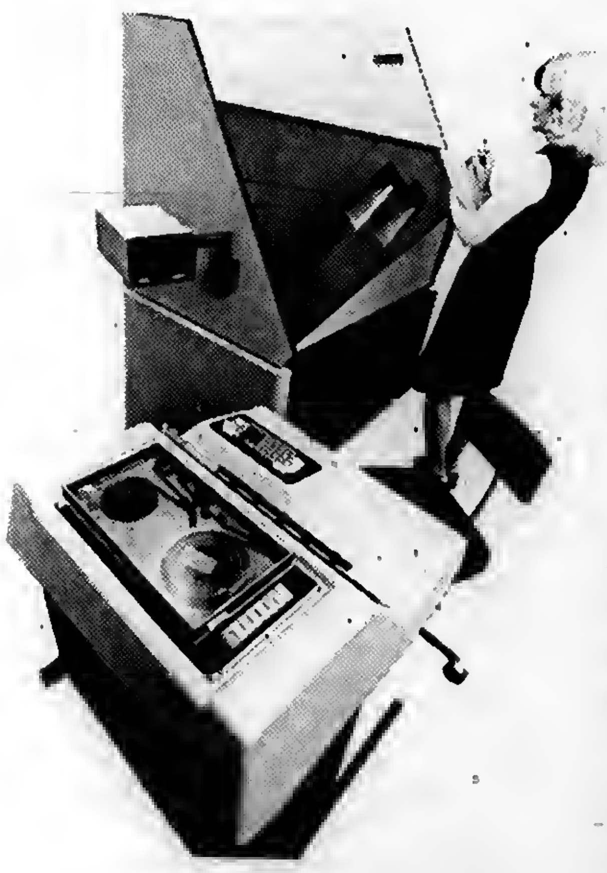

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would go about locating the correct officer and case.

When a wanted person is taken into custody or stolen or missing property is recovered, only the originating agency can remove the record and it is its responsibility.

While record removal is done by the entering agencies, record purging is completed by NCIC with differing criteria for each file. Wanted persons are retained indefinitely, as are stolen and missing weapons.

Motor vehicles and boats are retained for four years following the year of entry (YOE). YOE is also included in each record and allows automatic purging as are serialized articles, with the exception of money orders and travelers checks, which are only retained for two years.

License plates are kept in the file for one year after the year of entry. Vehicles entered with a license plate but without a VIN are purged after 90 days.

There is nothing to preclude an agency from reentering a record after its expiration. For example, a license plate number may be the only available evidence in the investigation of a serious offense.

It would be foolish to allow the NCIC record to be destroyed after one year. A few days following the purging, an officer might initiate a query on that plate, possibly out of suspicion or routine, and the response would be "No Record."

One practice that exists is the reentering of records when notification of deletion arrives, providing enough interest still exists in the investigation. To avoid surreptitious manipulation or elimination of records, originating agencies are notified of any request for, elimination or purging of entries.

Quick Record Growth

From the original 15 control terminals; NCIC grew until in 1971 there were 102 on-line control terminals and service had expanded to all FBI offices. The accompanying chart depicts the growth of access locations and the elimination of redundant or noncost-effective control terminals as well as file additions, expansions and hits.

From the data contained in the chart, it can readily be seen that the number of records in most files grew most rapidly during the first three years of a file's existence. Afterward, the percentage of growth increase over the previous year gradually decreased in most cases.

It is still too soon to have reached a level growth rate, and as long as new users continue to come on-line and the increasing ease of access promotes a higher volume of entries, inquiries and hits, reasonable assumptions about growth rates can not be made.

The number of records in a file fluctuate dramatically because of unusual occurrences. For instance, the enormous growth in the stolen securities file during 1970 and 1971 was a result of the entering of tens of thousands of serial numbers of U.S. currency paid in ransom to airline hijackers and other extortionists.

At some point in the future, large blocks of these records will be simultaneously purged, causing a drastic drop.

Prior to NCIC, there were no central repositories from which an officer could gain information on items he might have been investigating. The process usually involved many long distance telephone calls, teletypewriter messages, hunches — and, many times, luck.

With the inception of the system, a long distance telephone call to one of the few control terminals narrowed the procedure, but the time element was a continuing factor when the information need was immediate.

Responses during this period could take two to 30 minutes. As peripheral terminals were attached to the control terminals and other computer systems were installed in other geographic areas, local telephone and radio requests became more common.

Many systems are in operation today in which keyboard terminals, located in police vehicles, permit immediate inquiry and timely response. It is the elimination of the human-to-human transfer of information that has drastically reduced the span of time involved from request to receipt.

I believe there is a direct relationship between the degree of suspicion an officer has concerning an item and the amount of time he is willing to wait for a response on that item. Should no degree of seriousness exist, such as when an unfamiliar vehicle appears in a particular location, he is less likely to initiate a request if he knows the response may take 15 minutes than if he can expect an answer in 20 seconds.

Just as the record growth rate rose and declined, so did the number of control terminals. In 1971 many states had more than one, each serving certain geographic areas via telephone and radio communication.

As control terminal after control terminal was interfaced with local — state, county or city — computer systems and provided access to numerous agencies through remote keyboard terminals, the need for many other control terminals was eliminated. Most of these which were eliminated were operated by counties or large cities that were later interfaced with their respective state's computer system

Joint Venture

This enormous criminal justice data system is more than an FBI-run computer. NCIC is a joint venture comprised of the current 86 control terminal operators.

Committees drawn from the user population plan, construct, operate, evaluate and safeguard the system. Among them are the NCIC Advisory Policy Board, the NCIC Working Committee, the Technical Committee and the Security and Confidentiality Committee.

The Advisory Board, according to the FBI, "recommends to the FBI general policy in connection with philosophy, concept and operational principles, particularly in the relationship of local and state system with NCIC." The members of the board are elected by their peers — other control terminal users.

The Working Committee has the responsibility for planning, designing and updating the amount and types of data to be included in records. In general it oversees the formulation, maintenance and alteration of the data base.

The Technical Committee applies computer technology and automation and to former methods of law enforcement filekeeping and communications. The Security and Confidentiality Committee has been charged with "adopt[ing] procedures to protect the

(Continued on Page 18)

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IN DEPTH

(Continued from Page 17)

confidentiality of criminal history data in the NCIC system."

NCIC's basic purpose is to "serve as a national index and network for 50 state criminal justice systems," according to the FBI. Several purposes, both concrete and abstract, are fulfilled by this centralized operation.

First, it has made unnecessary the preparation and sending of countless wanted posters and teletypewriter messages.

Countless manual reports, records and files no longer have to be maintained, let alone prepared.

And while these changes have not come without any local expense, much of this new equipment has been funded by the Law Enforcement Assistance Administration (LEAA) through state planning agencies.

Numerous Benefits

Unfortunately, NCIC cannot measure the amount of deterrent it provides, but that is true of most police activity. Numerous benefits abound, however. These include investigatory time saved and an increased apprehension rate for wanted persons as well as recovery of property.

After all others have been described, however, the ultimate benefit lies in the ability of a patrol officer to obtain knowledge about a vehicle and its occupants prior to his actual physical contact with them.

It is not necessary for NCIC to be a repository for all police information in the country. Herein lies the reasoning behind development of state, county and some large municipal information systems.

Late in 1971, NCIC added its eighth file. Known as the Computerized Criminal History (CCH), it developed from its forerunner project, the System for Electronic Analysis and Retrieval of Criminal Histories (Search), which was funded by LEAA.

Like the other NCIC files, CCH could not encompass all histories of all criminals. The NCIC staff and committees formulated certain criteria for the file which excluded all offenses which did not constitute true criminal activity. Drunkenness, juvenile delinquency and traffic offenses were some of the behaviors not considered.

It was further decided that it would be the responsibility of each state to determine the significance of each entry as well as entering, updating and modifying the records.

These records were designed to contain not only the personal descriptive data of the individual, but complete arrest and court information. Charges, single or multiple, are listed for each arrest as well as the arresting agency and date. Follow-up entries by the courts then provide adjudication dispositions for each charge.

Correctional institution entries show location of confinement as well as dates of entry and release. The CCH file is limited to a degree in that only agencies with a computer interface can request a copy of the entire record.

Some of the other security features practiced to ensure the confidentiality of CCH, as well as most other files, are:

- The ensurance of the physical security of participants' computer sites, as well as that of all remote terminal sites on-line for criminal history data.
- A limit on the number of personnel having access to terminal devices.
- The screening of all such personnel as well as all data center personnel having access to criminal histories.
- Maintenance of logs and other appropriate records to identify users of the file.
- Establishment of editing procedures to ensure file accuracy.

CCH has sparked a great deal of controversy. Privacy has been the primary topic of debate. Of great concern is the possible misuse of data in the file, the lack of timely validations, data inaccuracies and the lack of notations of court dispositions of criminal charges.

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Law enforcement officials have maintained that totally dedicated computer systems are necessary for file integrity while government officials have desired shared systems for budgetary reasons. A shared system is much more vulnerable to unauthorized access.

Under NCIC guidelines, each state's laws provide the criteria for handling records entered in CCH. Because of this lack of uniformity, some fear a less than acceptable handling and use of data in the file.

Massachusetts, which has some of the most protective legislation enacted, has opted not to join CCH. This action on its part has precluded any mishandling of that state's stringently collected and protected information.

The state's records are available to other law enforcement agencies through the more traditional channels of communication, but not to private concerns, such as debt collection agencies and insurance companies, that may have been able to gain access through a state with little or no restrictive legislation.

In addition to security safeguards, policy and law, follow-up procedures (editing) have been instituted and maintained to validate entries.

The files are periodically run through various computer editing programs which check the records and ensure conformity with a predetermined format. When certain portions of a record do not conform to a logical configuration, this is reported to entering agencies.

Earlier, when discussing the vehicle file, it was noted that American VINs are nearly unique. This is a by-product of an encoding method that vehicle manufacturers began more than 10 years ago.

Should a 1968 Ford be entered in the vehicle file, it must be accompanied by a VIN or the record will be purged after 90 days. If or when the VIN is included, it must be 11 characters in length. Using "A" to represent letters and "9" to represent numerals, the VIN must be of the form "9A99A999999."

Any deviation from this format would not pass the editing routine; the originating agency would be advised that its entry was in error and asked to obtain and modify the entry with the correct information.

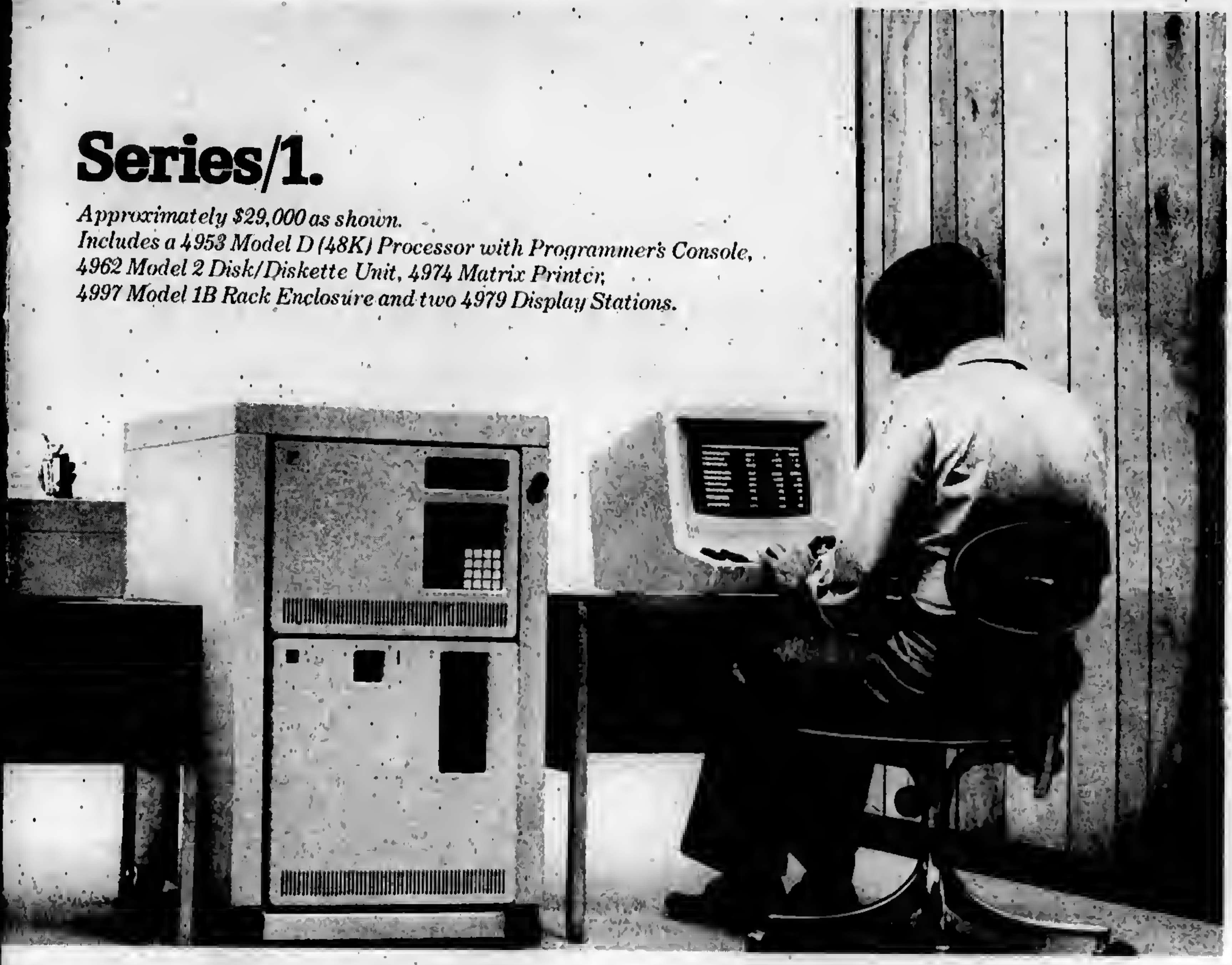
It is quite evident that accurate information is the basis upon which elements of a criminal justice system rely. Information is that one medium which links the police to the courts, the judiciary to corrections, prosecution to rehabilitation.

Unfortunately, when information is unavailable, erroneous or incomplete, the system fails to operate with any acceptable degree of efficiency.

Daniel R. Kashey is director of the Monmouth County, N.J., Police Computer Office, which is in the last stages of acquiring a system that will link that county's 50 municipalities with the National Crime Information Center, the National Law Enforcement Telecommunications System and the New Jersey State Crime Information Center.

Kashey, who holds a bachelor's degree in criminal justice and is close to a master's in computer science, has six years' experience as a police officer.

In addition to his work with Monmouth County, he teaches courses on management information systems at Stockton State College.



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Editorials

Resource Sharing

The idea of resource sharing typified by the recent Datapoint Corp. Attached Resource Computer (ARC) announcement [CW, Dec. 5] — and to a lesser extent by the Sycor 445 — seems to be an idea whose time has come, or at least is on the way:

However, as with most concepts in the computer community, the final proof of whether resourca sharing will be beneficial will be up to users.

If users find they can make efficient use of such systems, then the systems will be truly revolutionary. If users feel constrained from testing the new concepts, however, then tha systems will have to be relegated to the scrap pile.

Too often in the past users did not try or even examina new concepts until the concept received the "IBM seal of approval." Examples of this type of thinking abound, but perhaps tha best is virtual storage — pioneered by Burroughs Corp. but not widely accepted until IBM "invented" the idea.

Users will hopefully evaluate rasoure-sharing systems on their merits and not wait until the idea is either endorsed or blackballed by IBM.

That's the only way innovative systems will get a fair test.

Curious Sense of Law, Ethics

The Society of Certified Data Processors (SCDP) recently granted Alan Taylor its first Founding Father Award, but in the process once again raised many questions about ethics.

The award to Taylor was deserved — ha founded the society in 1971 — but the questions raised by the SCDP's press release on the subject ara disturbing.

According to the society, Taylor's writings relate to the subject of "data processing ethics" in "two ways: (1) suggesting employers adopt a code of ethics for their data processing people and (2) reducing all the ethical-unethical debate down to one crystal clear point that 'breaking the law is unethical.' "

The phrase "ethical-unethical debate" reveals a limited and very naive conception of the term "ethics." The SCDP apparently believes human behavior can be uniformly judged in discrete portions as either "good" or "bad," one or the other. The society would decide which is which.

The SCDP thus chooses a dualistic scheme of ethics, foreign to the philosophies of millions of people apparently deemed incapable of ever becoming "legally recognized professionals."

As to "reducing ... debate down to one crystal clear point that 'breaking the law is unethical,' " this is an obvious self-contradiction and betrays a dangerous and highly argumentative supposition.

A point is never "crystal clear" from the start in a debate; that is why it can be debated.

Moreover, law breaking is not necessarily unethical. One can easily suggest many laws as "unethical" by a number of ethical schemes.

The SCDP meant "breaking the law is unethical" to be a tautology, which it is only if one surrenders to law as the only possible ethical scheme — a trait of the Auschwitz ovenkeepers, one should remember.

The society seems to have a curious sense of "law" and "ethics." What is at best its confusion imperils the civil liberties of the entire DP community.

The SCDP evidently accepts as an article of faith that data processing "professionalism" equals "legal recognition" equals SCDP membership equals subscription to the SCDP "code of ethics." But this is surely opan to question.

It is, in fact, a political question, for the SCDP seeks to constrain behavior. Tha DP community should consider who intends to do the constraining and — especially — why they would want to.

Data Past

Five Years Ago
Dec. 13, 1972

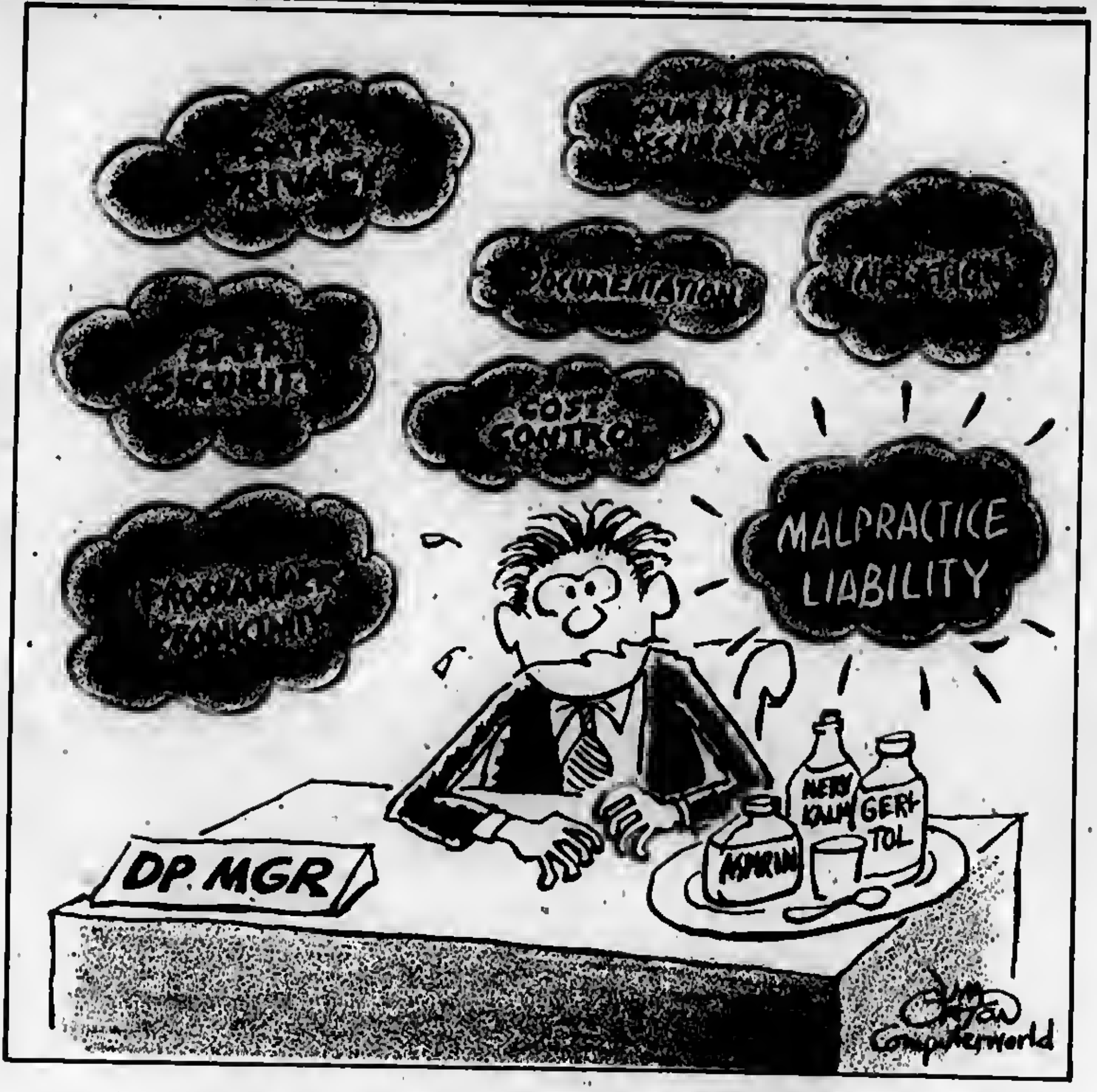
ANAHEIM, Calif. — The Fall Joint Computer Conferenca that was held here this week marked the last of the twice-yearly shows sponsored by the American Federation of Information Processing Societies. Tha association decided to switch to a once-a-year format with greater emphasis on user topics.

Eight Years Ago
Dec. 17, 1969

WHITE PLAINS, N.Y. — Unbundled 360 compiler prices ranging from $40- to $275/mo were announced by IBM along with the Time Sharing Option for OS/MVT environments and the Interactive Terminal Facility for the 360/25 and up under DOS. The packages offered Basic and Interactive PL/I as well as two Fortran compilers, a Fortran library and an Ansi-standard version of Cobol.

— — —

CAMBRIDGE, Mass. — The Committee of Research Policy agreed unanimously to permit Harvard professors to participate as individuals in Project Cambridge, a controversial research project designed to develop computer techniques in behaviorial sciences.



Letters to the Editor

How Will Justice Prevail?

I am incredulous that the "privacy backers" are objecting to the Department of Health, Education and Welfare's Project Match [CW, Nov. 21]. The backers are more concerned over the praservation of the individual's privacy than over the detection and prosecution of fraud.

How will justice ever prevail if access to evidence of wrongdoing is denied to enforcement authorities by law and/or regulations?

David Lariscy
Atlanta, Ga.

Filling the 18-Minute Gap

I was very interested in the recent article on recovering information from erased tapes [CW, Nov. 28].

Recovering data from residual signal levels on tapes "even after intensive erasure" is theoretically sound and now obviously it is practical.

My first reaction to the article was: Let's send Sysco Engineering the Watergate tapes with the infamous "18-minute gap" and watch Washington jump!

Don Root
Columbus, Ohio

Less-Than-Fond Farewell

All the time I spent as a *Computerworld* subscriber I was tempted to write letters to the editor but never was motivated enough. Now that my subscription has expired, with my blessing, I am finally motivated enough to write.

You consider yourself the computer community newspaper, yet I get multiple advertising letters as a result of your poor mailing lists.

My subscription has expired, but a month later, I still receive copies of your papar.

You waste endless amounts of paper rehashing the same endless arguments over certification and check digits.

You persist in printing childish and useless articles such as the ones in the Nov. 14 issue discussing the writing style of Frank Binder ["Pompous Verbiage Clouds a Good Thesis . . ."].

You bore us with manufacturer articles about how a specialized piece of hardware or software fits a unique application with implications for all of about two people.

You announce endless products with little assistance in placing them relativa to manufacturers' product lines and to other similar but well-known items.

Most DP magazinas seem to cover all the important news once a month and do it adequately.

This is why I stopped my subscription. You claim to speak for the industry; what hurts is that you may be representative of the industry.

Jerry Bennis
Springfield, Va.

More Meaningful Code

Ket Watters' letter ["Cobol Verb Suggested," CW, Nov. 28] suggested SPECIFY as a new verb to set a level 88 condition name. Until that happens, I would suggest he change his example code to the following:

```
05 MARITAL-STATUS-FLAG   PICTURE 99.
   88 STATUS-IS-MARRIED    VALUE 0.
   88 STATUS-IS-SINGLE     VALUE 1.
05 VALUE-OF-MARRIED      PICTURE 99 VALUE 0
05 VALUE-OF-SINGLE       PICTURE 99 VALUE 1.
```

This will allow the more meaningful "MOVE VALUE-OF-MARRIED to MARITAL-STATUS-FLAG" instead of "MOVE 0 TO MARITAL-STATUS-FLAG."

Les Bain
Toledo, Ohio

Computerworld welcomes comments from its readers. Lettars should be addressed to: Editor, Computerworld; 797 Washington St., Newton, Mass. 02160.

Leadership Qualities Neglected

Narrow Views Lead to Dead-End DP Career

By Jack Stone
Special to CW

And still another torrent of commentary from the readers! This time it's in response to my column on "behavior shaping" in the design engineering function [CW, Nov. 7].

One of the readers wrote a provocative letter on technical specialization. He stated that most DP managers are guilty of excessive concentration on the growth of the technological capabilities of their personnel, to the exclusion of the development of their managerial and leadership qualities.

He believes such practices have, in effect, backfired with respect to the careers of the managers themselves, since that technical specialization has cut short any growth up and out of the DP establishment.

But here's the way he put it. What do you think?

Dear Jack:

Mismanagement is indeed a problem in DP, but at all levels, not just those of design engineering. The particular chap in your column is only one of the great many whose talents and abilities are abused through mismanagement. Is it any wonder that employees seek one employer after another hoping to find, usually in vain, some professional managers?

One of the main functions of a manager, in addition to getting jobs completed, is to help develop employees into more valuable assets to the firm, particularly as DP managers. This requires looking upon employees as other than technical specialists pigeon-holed to work only in specific areas of expertise or as machines to be used for technical development. This means that the manager needs to have a human development plan for each employee to broaden his perspective and gain new knowledge that can be applied to jobs of greater responsibilities.

But such plans run counter to the career development practices of most DP shops. DP managers stress technical expertise and specialization to the almost total exclusion of any kind of generalist qualities. That employee hired as the inventory control specialist is on the payroll to perform that job and none other ...Thus pigeon-holed specialists remain in their pigeon holes, only gaining advancement by going to a new firm, but finding they are to specialize once again.

The Human Connection

To development potential managers, the DP manager has to include some kind of program for managerial training to be taught to interested employees. This is not possible for most DP managers, because they know far too little about management principles, methods and techniques, having themselves been moved up from some role as super specialist or expert technologist. This entire process fosters and builds heavily upon the premise that you can only do what you have done before, that it is too costly, too time-consuming to train employees in new applications areas...

The unwillingness of upper management to promote DP managers into line functions is the inevitable outcome of hiring practices and qualifications demands that are based on technology specialization. Thus, DP managers perpetuate the very climate and conditions which limit themselves to a dead-end career path!...

Most DP managers do not curry development of fast-track employees who show marked potential for leadership because such persons would then become threats to the DP manager's job. These people are either held in check through repetition of poor assignments

(Continued on Page 22)

Exam Time Approaching

Test Yourself on 20 Sample CDP Questions

The Taylor Report
By Alan Taylor CDP

The 1978 Certificate in Data Processing CDP examination is upon us, and practically the only question left is whether people who have not put in their applications should try out in one or more sections. Well, one way to decide this would be to try out the sample questions from the study guide. Then, if you want to know how you scored (I think you will probably know anyway), you can call the Institute for the Certification of Computer Professionals (ICCP) at (212) 888-3208. They can also help you with regard to applications, etc.

ICCP-Run Exam

The annual examination, run by the ICCP to establish high standards for data processors by emphasizing both breadth and practicality, has five sections — Data Processing Equipment, Computer Programming and Software, Principles of Management, Quantitative Methods, and Systems Analysis and Design.

The institute awards a certificate of excellence to the top scorer among the first-time participants in each section. The overall top scorer receives a $500 check along with the certificate.

The multiple-choice examination is open to all and fees are $35 plus $10 per section. It will be given all over the U.S. and in Canada on Feb. 18. If you need an application, then call that New York number immediately, as otherwise it will be too late for this year.

Here, then, are the sample questions:

Section 1. Data Processing Equipment

1. Which of the following computer characteristics will tend to result in a faster computer system?
1. Buffered, serial, fixed word
2. Asynchronous, buffered, parallel
3. Parallel, buffered, asynchronous
4. Synchronous, buffered, variable word

2. Which of the following statements concerning COM (computer output microfilm) is FALSE?
1. COM devices basically photograph the image on a cathode-ray tube.
2. There are two major types of COM devices, alphanumeric and graphic.
3. Graphic COM devices are used primarily as substitutes for impact printers.
4. COM devices can write characters at rates up to 500,000 characters per second.

3. Which of the following characteristics would likely apply to a direct access file utilizing indexes or dictionaries as its addressing technique when processing randomly?
1. Randomizing formula
2. Two accesses are required to get each record.
3. Synonyms will be generated which will result in extra accesses.
4. There will be a high incidence of gaps or unassigned physical records within the file.

4. In a microprogrammable minicomputer, the microprogram is stored
1. in core memory.
2. on magnetic tape.
3. on a direct access unit.
4. in read-only memory.

Section 2. Programming and Software

5. In Cobol, what type of condition is exhibited by the expression: A AND B OR D OR E?
1. Or
2. Complex
3. Compound
4. Exclusive or

6. A compiler would usually have to produce programs in the form of a relocatable object deck in order to make effective use of which of the following?
1. Macro instruction
2. Function subroutines
3. Floating point operations
4. Monitor programming control systems

7. Which of the following Cobol statements would link subroutine A to subroutine B?
1. PERFORM 10 TIMES SBR-B THRU SBR-A
2. PERFORM SBR-A THRU SBR-B 10 TIMES
3. COMPUTE GROSSPAY = SBR-A + SBR-B
4. IF TOTHRS IS GREATER THAN 40 GO TO SBR-A ELSE GO TO SBR-B

8. Every machine language computer instruction must contain which of the following?
1. Operation code, only
2. Operation code, operand
3. Operation code, two operands
4. Operand, next instruction address

Section 3. Principles of Management

9. Which of the following is not an important element in the question of lease vs. purchase of EDP equipment?
1. Cost of money
2. Tax considerations
3. Maintenance expense
4. Parallel operations cost

10. Which of the following would be considered an advantage in contracting for EDP systems applications work?
1. Avoids maintaining a permanent staff larger than is required over the long term
2. Avoids maintaining a large staff of systems programming people and reduces overhead
3. The organization does not have to take the time to gain knowledge and experience
4. A contractor acquires know-how about the company and can therefore be used in the future as an alternate source for make vs. buy opportunities

11. Which of the following items should not be classified as an asset for financial statement purposes?
1. Deferred charges
2. Retained earnings
3. Land and buildings
4. Accounts receivable

12. While strategic planning is heavily staff oriented, management control is heavily oriented toward
1. financial managers.
2. planning managers.
3. marketing managers.
4. operational managers.

Section 4. Quantitative Methods

13. If $y = 5x^3 + 3x^2 + 6x + 2$ which of the following is NOT a term of dy/dx?
1. 8
2. $6x$
3. $3x^2$
4. $15x^2$

14. With 2 letters or digits followed by 3 digits, how many codes can be created if the letters O, Q, and I are not to be used to avoid errors with 0 and 1?
1. 66,000
2. 100,000
3. 1,069,000
4. 1,296,000

15. If budgeted unit sales=10,000, selling price=$10, fixed costs=$18,000, and variable cost is 70% of sales, what is the break-even point?
1. $25,714
2. $80,000
3. $72,000
4. $142,857

10. To double the reliability of an estimate, which is the same as decreasing the standard error by half, the size of the sampling must be increased
1. two times.
2. four times.
3. eight times.
4. 16 times.

Section 5. Systems Analysis and Design

17. What would be the correct check digit (X), using the sum of the digits method, for the identification code 85463X?
1. 2
2. 5
3. 6
4. 26

16. In a real-time control system, each logical message requires 500 milliseconds of control processor time. Each remote control device requires synchronized service 5 times per minute. Which is the best estimate of the largest number of remote control devices that can be served?
1. 10 thru 19
2. 20 thru 29
3. 30 thru 39
4. 40 thru 49

19. Which of the following is NOT normally applicable in establishing the objectives of a systems study?
1. Develop and design the data files
2. Analyze and evaluate present operations
3. Develop recommendations for changes required
4. Review present and future corporate goals and objectives

20. Which of the following is the LEAST desirable purpose for conducting a post-installation systems audit?
1. To isolate remaining problems
2. To finalize system's documentation
3. To identify the actual improvements made by the new system
4. To determine if the system is performing according to specifications

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DP Careers Often Dead Ends

(Continued from Page 21)

which do not let them expand or else fired...

To find firms that develop their people for management slots is so difficult that in actuality very, very few DP personnel ever succeed as managers...

I do not think responsibility for the perpetuation of these abysmal conditions of management careers rests entirely with the DP managers themselves. Certainly the attitudes of upper management towards DP managers — that they are but so many technicians who are incompetent to rise higher — have also contributed to the close-endedness of DP careers.

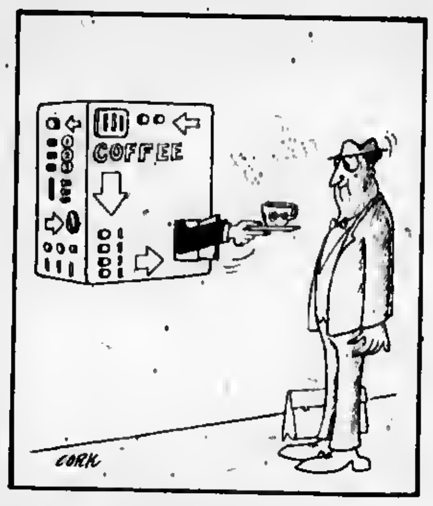
All too frequently, upper management stresses technological specialization as a must for DP management.

It is to be wondered how upper management ever expects these conditions to change when it also, through narrowmindedness and tunnel vision, perpetuates these limiting and limited viewpoints of DP.

Somehow, upper management has to be educated so it can adopt a wider view about DP functions and DP personnel. If not, the current conditions which cause 25% to 35% turnover of DP managers annually will continue, and DP as a long-range career will remain but a dead-end road which stops at the DP managerial level.

In closing, I'd like to ask where the desperately needed changes begin and when they will begin. Are we doomed to have DP always remain as it is today, a function of firehouse operations and management by panic?

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.



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CW at Sigmetrics/CMG

CPE Methodology Helped

Cray-1 Evaluated Despite Site Problems

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Several attempts to evaluate the unconventional power of the Cray-1 array processor from Cray Research, Inc. provided a study team with both information about the system and an evaluation methodology that ultimately worked well despite severe time and resource constraints.

The study was conducted jointly by the Federal Computer Performance Evaluation and Simulation Center (Fedsim) and personnel at the Los Alamos Scientific Laboratory (LASL). The Cray-1 was being considered as a replacement for one or more of the Control Data Corp. 7600s at LASL, according to Fedsim's David Lindsey.

One of the evaluation team's chief constraints was a need for demonstrable impartiality, Lindsey told attendees at the national conference held here recently by the Computer Measurement Group (CMG) and the Association for Computing Machinery's Special Interest Group on Computer Performance Measurement (Sigmetrics).

In addition, the team was faced with an established, inflexible deadline: The Cray-1 — "It was Serial No.1, by the way" — was on loan to the lab for six months, Lindsey noted.

But the building of a good test was hampered by a workload characterized by Fortran programs up to 50,000 lines long and by the absence of a Fortran compiler for the Cray CPU.

The initial absence of effective I/O for the Cray also added to the team's difficulties. The "primitive" operations environment of the Cray "severely limited" the programmers working on the test, according to Lindsey.

All communications with the Cray-1 was handled through a Data General Eclipse. Magnetic tapes prepared for other machines at the lab could be read, "but only after an elaborate translation procedure."

There was only one card punch and the Cray software was geared to a card format incompatible with other lab work, Lindsey said.

The initial evaluation method considered was based solely on the CPU cycle times of the two machines: 12.5 nsec for the Cray-1 and 27.5 nsec for the CDC 7600. The ratio of those two, 2.2, could naively be the speed ratio of the two machines, Lindsey acknowledged.

But that didn't work since they required different numbers of cycles and even different numbers of instructions to accomplish comparable operations.

The next proposal was to consider the frequency of instructions types used on the CDC 7600, assume there would be a comparable frequency of the same types on the Cray-1 and then compare the published execution times for the instructions on the two machines:

But that approach didn't take the differing overlap techniques into account, nor the different number of instructions used to get the same operation done, Lindsey pointed out.

Detailed simulation was rejected as an evaluation approach in part because the creation of an effective simulator would have required levels of support "far beyond the human and time resources available" to the evaluation.

The same could be said for benchmarking, Lindsey continued. That would have required, as the simplest level, recording the existing Fortran programs into Assembler language for each machine because the Cray-1 had no Fortran at that time.

The sequential rejection of each of those methods finally led the evaluation team to the idea of extracting benchmark kernels from existing CDC 7600 programs. These kernals must come from programs that consumed enough CDC 7600 time to merit conversion to the Cray-1, the team decided.

Beyond that, only programs that would continue to be used at current or increased levels and for which support for conversion existed within their own user groups would be used as a sample base, Lindsey said.

Five programs were selected for samplings, and every nth position in memory provided the base instruction for the benchmark kernel. The Fortran instructions on either side of the selected one were also included in the kernel, which was recoded in Assembler and executed on each of the machines.

The team decided that for the Cray CPU to be found acceptable, at least 50% of the kernels would have to run twice as fast on the Cray-1 as on the CDC 7600. If the results were inconclusive in the first small sampling, more kernels would be drawn until a decision was obvious.

"Fortunately for the health of the programmers involved," the Cray-1 passed all the tests in the first, minimum-size sample, Lindsey said. The speed ratios ranged from 4.12 to 2.03 and, when the basic tests were completed, closer studies showed the Cray-1 was not only faster but "cleaner" in design, he added.

OS Files Compared by 'Accuchek'

NEWTON, Mass. — An OS file-compare utility that is said to obsolete IBM's IEBCOMPR is now available from Arkay Computer, Inc.

The IBM routine simply dumps unequal records on the printer in hexadecimal form without any indication of where the mismatch occurred while Arkay's Accuchek package underlines all bytes that are unequal, according to a spokesman.

Accuchek provides the user with a variety of options that include hex or character printouts, side-by-side listings for a "natural" and more comfortable comparison and field-by-field comparisons so irrelevant mismatches can be ignored, he said.

The control cards are very nearly free-form with a 10-column range for the start of the operation code and the ability to enter keyword parameters in any sequence, he added.

All control card entries are optional with defaults established for certain omissions, Arkay said.

The Accuchek user can also set parameters to limit printing to lines that contain errors. This averts the flood of paper that can accompany the use of IBM's utility, which does not have such selectivity, the spokesman claimed.

Printing by the IBM software will cease only after it has identified 10 consecutive error records or the end of the file, Arkay said. Accuchek's control cards include a parameter that can reportedly stop the run once any predetermined number of records or errors have been identified regardless of whether they are consecutive.

The independent's utility has the flexibility to process and match ascending key files, compensating for missing records, according to its vendor. Comparisons can be made on unequal length files or on unequal length fields; the user identifies what is to be compared and may specify what is acceptable filler when the things being compared are of different lengths.

Accuchek can process fixed, variable, undefined and Vsam files under any OS/VS environment, the spokesman said. Execution time is said to equal or surpass that of the IBM utility.

The package is available for $800. Arkay is at 24 Manor House Road, Newton, Mass. 02159.

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New Measures Sought

Obfuscation No Help to Anyone

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Many of the traditional and widely used measures of computer system performance are obfuscatory: they measure the wrong things, the right things wrongly, or nothing at all, according to David F. Stevens of Lawrence Berkeley Laboratory, University of California.

DP management should avoid some of the older terms and adopt a set of measures that "illuminate, rather than obfuscate, the true external character" of a system, Stevens warned attendees at a recent joint meeting held here by the Computer Measurement Group (CMG) and the Association for Computing Machinery's Special Interest Group on Computer Performance Measurement and Evaluation (Sigmetrics).

The real problem, he acknowledged, is the ease with which words in the English language can acquire new meanings.

Stevens analyzed "availability" as an example of what he meant. That term once referred to the fraction of the time the system could be used. In DP jargon, however, it has come to be synonymous with "uptime" and is seen as the fraction of scheduled time the system is available to the computer center.

That "new" definition reduces the time base. Time devoted to preventive maintenance or operating system development and installation is excluded from "scheduled time," he noted.

The time considered "available" by DPers includes many periods when the system is not, in fact, fully usable. These include both start-up times and run-down times. Time devoted to rerunning lost or interrupted jobs is also counted as "available," Stevens said.

CW at Sigmetrics/CMG

The "new" definition of availability is deceptive because these differences combine to give an impression of a much higher level of performance than that seen by the user. Even if DP is satisfied, the end user may not be, he warned.

As an example of how different the view of the DP manager and the user can be, he described a one-shift operation with an hour of maintenance on Monday and an hour of system development time every day.

Startups take half an hour each and rundowns take half an hour before the system development time and an hour before the end of day, he continued. He further assumed a system crash for 15 minutes one day and another for an hour, each requiring start-up time afterward.

By the current defintion, this center had the system for 32.75 hours out of 34 for a seemingly respectable 96.3% availability. The user, however, would find the system available — in the sense of being able to accept his input — only 19.25 out of 40 working hours, or 48.1% of the time.

Discrepancies of this magnitude — "which are not uncommon" help to explain the failure of some DP managers to understand their users' cries of anguish and outrage, Stevens said.

Tests Suggest: Check Language

WASHINGTON, D.C. — The aggregate results of some recent experiments on the relative efficiency of various high-level languages tend to support the use of the languages in application areas for which they were designed.

But, according to Jerome W. Blaylock of Texas Southern University, the exceptions were sufficient to merit the consideration of using high-level languages for the solution of problems which differ from those for which the languages were meant to be used.

After describing tests he had run while at the University of Houston, he told a session of the recent Sigmetrics/CMG conference here "one possibility is to program selected applications in two or more languages to determine which is more efficient" on a case-by-case basis.

Even at the start of his experiments, he recognized that languages generally were created to cope with particular types of problems. But he wondered if an installation might not be better off using available compilers and people knowledgeable in their use than switching to another language just because it is more appropriate for some problem.

The hardware used by Blaylock was a Univac 1108 running under the Exec 8 operating system at the University of Houston computer center.

(Continued on Page 26)

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DDP Adds New Twist To Traditional CPE

WASHINGTON, D.C. – As long as distributed data processing (DDP) systems include a centralized CPU as a major node – "and in most cases, they will" – many of the traditional computer performance evaluation (CPE) techniques and measures will remain useful and important, in the view of Phillip C. Howard.

In addition, there will be less concern about the performance of minicomputers and other small units that make up the distributed part of the system, the publisher of *EDP Performance Review* predicted in a session at the recent joint conference here of the Computer Measurement Group (CMG) and the Association for Computing Machinery's Special Interest Group on Computer Performance Measurement and Evaluation (Sigmetrics).

However, he warned, there will be new considerations for the performance analyst, particularly relating to data base distribution and communications. If an installation decides to adapt the distributed approach, it will be to the analysts' benefit to track the results carefully.

They must be sure user services are improved, costs remain in line, and generally better DP operations result in the long run, he said. Otherwise the effort will have been a waste of time, effort and money.

At the top of his list of performance considerations for DDP systems, Howard raised the issue of economy of scale. He noted that in our present transition period there is no clear indication that centralized, decentralized or distributed systems are "automatically" the most cost-effective approach any more.

CW at Sigmetrics/CMG

Data Bases

One significant characteristic of distributed systems, Howard continued, is the distributed data base. But a problem arises when there is a need for both centralized and distributed data, he said.

He cited an article in *EDP Industry Review* that suggested it makes sense to distribute a data base – more accurately, perhaps, to avoid consolidating a data base – if 80% of the data generated at a remote site is useful only to that site.

Because of the cost of communications and the limited capacity of communication lines, file transfers to and from remote sites must be kept at a minimum, he warned.

Traditional disk and mass storage optimization problems related to access time and space utilization still apply. Continuing attention must be given to such things as allocation of files across drives, optimum placement of indexes and channel assignments, he noted.

Disk Bottlenecks

As long as disk devices with relatively long access and data transfer times (relative to CPU speeds) are in use, they will be a source of system bottlenecks, Howard asserted.

Performance considerations related to a central mainframe running as a keystone in the DDP setting are much as they are in a conventional environment, with one or two additions, he continued. If offloading of some of the work, and probably some reduction in the size of the performance staff, doesn't take place as the DDP system matures, "It may be an indication that the entire basis on which the system is based is faulty."

Monitoring of the outer units may be worthwhile, he said, but only if there are a number of identical units doing the same thing.

Proceedings Available

WASHINGTON, D.C. – The 320-page proceedings of the Sigmetrics/CMG VIII conference are available for $35/copy from either the Association for Computing Machinery (ACM) Order Dept., P.O. Box 12105, Church St. Sta., New York, N.Y. 10249; or Ian K. Roome, CMG Treasurer, 17648 San Candello St., Fountain Valley, Calif. 92708.

Tests Suggest: Check Language

(Continued from Page 25)

The algorithms chosen were divided into two basic categories: scientific (with substantial computation) and business (with information processing emphasized). Blaylock had five "scientific" algorithms with arithmetic computations, iterative processes, functions and matrix manipulations.

The three "business" algorithms included I/O processing, report formatting and logical decision-making, he added.

Two subroutines were used to determine the execution times of the experiments. The first subroutine got the starting time and stored it in common. The second got the ending time, calculated the elapsed time to the nearest one-tenth of a millisecond and printed it.

Generally, the execution times for the Cobol versions of the experiments with computational characteristics were greater than those for the Fortran and Algol versions, but Blaylock noted several exceptions in which the Ascii-oriented Cobol versions were comparable to those of both Fortran and Algol.

The execution times for the Algol versions of the experiments were greater, almost without exception, than for the Fortran versions.

The experiments involving information processing as a major characteristic indicate that Fortran is, or can be, an effective alternative to Cobol. Algol was left out of these tests, Blaylock noted, because of file incompatibilities.

In further work on the comparative analysis of high level languages, the number and variety of algorithms chosen and the number of different program authors should be expanded, he said in conclusion.

Data Management Eased With Dictionary Use

By David Thomas
Special to CW

In the last year there has been a growing interest both in data management and, as a natural complement, in data dictionaries. Despite this interest there is still considerable doubt in the minds of many users as to what data management really is and why it is important both to themselves and to their companies.

This is strange because those same users were quick to spot the information-giving aspects of computing and have been instrumental in moving DP. away from the bread-and-butter attitude of the 60s, when to have both the payroll and the sales ledger systems up and running was considered a major achievement.

Very few responsible managers still see their computer as little more than a mechanized clerk. Those same managements have generally realized that information means profits — provided it can be garnered and processed in time for its effects to be felt in the marketplace, on the shop floor or in the general administration of the company.

Number One Resource

In other words information — data — is a resource. Because of its tremendous versatility, it is arguably the most important resource a company has.

What makes it even more attractive is that the major part of the data used in analyses and management information systems is produced as a by-product of the bread-and-butter systems that were of such importance 10 years ago. It is the vast and growing source of data that forms the information side of the data resource.

For there is another side. No less important are the processes that use that information, particularly within the DP department itself, but also throughout the company as a whole.

Management of the data and the processes is essential. Like any other resource it can only be put to good use if it is controlled and organized in such a way as to become measurable. Whether this measurement is quantitative or qualitative is of little concern provided the result is justified, but without an earlier management stage no form of judgment can be applied.

This prior stage has been neglected in the past partly because data is, or appears to be, free and partly because, with the piecemeal development of systems that has taken place in the past, there has been little or no effective way of managing it.

Such piecemeal development is by definition uncontrolled development, necessitated by the learning process which has taken place among most users since the introduction of third-generation equipment. It is only now being realized that it is the relationships between items of data, as well as between the processes that use them, that are significant. Unfortunately, without some effective form of control these relationships cannot be recognized and therefore cannot be put to use.

Various methods of control have been attempted, particularly in those installations using data base techniques, but they have tended to concentrate on the information aspects of the data resource while ignoring the processes involved.

Additionally, if based on a manual system, the systems become so cumbersome that they are either discredited as being unworkable or a considerable staff has to be maintained to do no more than record which module uses which item of data.

By the time the interrelationships between all the modules that use a particular data element have been drawn, the average manual system is working to capacity and beyond, omitting questions of security and precluding the possibility of using those relationships in the generation of management reports or documentation. At best the situation can be created whereby the data resource is prepared for management rather than in the process of being managed.

Management of the data resource is identical in principle with the management of any other resource and the objective is the same — to reduce the capital cost of the resource while returning the maximum effective use of that resource commensurate with the needs of the company. When applied to data there are specific needs in terms of the need to avoid data duplication, the need to avoid data redundancy and a need to provide a centralized system, which is the only way in which extraneous data can be avoided.

An extreme example of an uncontrolled environment would be one in

(Continued on Page 28)

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Dictionary Use Organizes Management of Data

(Continued from Page 27)

which all programmers use names and data definitions of their own choice for any data items with which they are involved and then, having produced half a system, they all leave. The incoming staff would have to start the programming job all over again (and perhaps the systems work as well) simply to find out what everything referred to.

To a lesser degree this is what happens in a number of installations today, where whole rewrites of programs and modules are taken on simply as a means of avoiding the perpetuation of the problem.

It was this situation that led to the development of a number of data dictionary/directory packages such as Datamanager, into which MSP, Inc. has already poured nearly 30 man-years of effort. These systems are designed to provide a data management system independent of the actual mechanism of the corporate data resource, whether this is held using data base techniques or consists of a series of files. Additionally, the intention behind these sytems is that they should work equally well with manual systems and hand-generated information.

Datamanager works on its own data dictionary, which is a pool of information containing all details of the characteristics, attributes and usage of all corporate data. Most importantly, it keeps track of the complex interrelationships between different data forms. Studies carried out by the company suggest that an item of data is subject to an average of five such relationships, which helps to explain the enormous difficulties associated with a manual cross-reference system.

The details stored in the dictionary are data definitions rather than actual elements, and the dictionary can be described as a data base of those definitions which coexist with the corporate data resource. In other words it forms an image of the resource for management purposes.

Different Requirements

A brief look at any company administration quickly shows that data must be managed with two different requirements in mind: those of owners and those of users.

The owners are those who, quite literally, own data. They are the ones who are responsible for it in the way a buying department owns one set of information while the marketing department owns another, completely different set. The users of the data on the other hand are those who devise systems and programs which make use of that data on its owners' behalfs.

Owners can be quite independent of one another, and while some data is undoubtedly peculiar to its owning department, it is probable that in any company there will be some data which can be accessed by several departments. Thus, both a buying department and a marketing department need to know what has been sold, and the payroll department and costing department both need to know how long a man takes to construct a part.

The fact that this data is shared is immaterial to the owners (assuming there is no problem of security involved), but it is of great importance to the users. The users need this information so they can impose security checks if required and secondly, because the recognition of the double use of the item can prevent data duplication.

Controller Necessary

To coordinate the different requirements of owners and users, and to provide and oversee a standardized approach to the methods of expression of data definitions, it is necessary to have one person in control. The controller should be responsible for the creation of the data dictionary and for the establishment and maintenance of security levels.

The dictionary, in conjunction with the controller, acts as a form of clearinghouse for the requests of both users and owners. Provided the controller's functions are carried out efficiently, the corporate data resource can be subjected to a level of management not attainable by other means.

No Use, No Change

Without authority a user cannot access an item of data because its name and definition are unknown to him.

Nor can he create arbitrary data elements without the controller being aware of them.

Similarly, different owners can check to see whether that element already exists. If it does exist, a new owner can be established for it without either the new or any other owner being aware that the element is used elsewhere.

This then is the philosophy behind management of the data resource and the way in which software can help to bring effective management to a company's activities.

Thomas is vice-president of MSP, Inc. of Lexington, Mass.

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Modules Teach BAL

KANSAS CITY, Mo. — The Edutronics Group has added four course modules to its recently announced multimedia series on Basic Assembler language. "Instruction Formats" shows how to use BAL instructions.

In the "Assembler Process" module, the user is shown how the assembler source program is translated into machine language as well as what features the assembler has for debugging and documentation and how to use them.

The "Indexing" course module discusses the construction of tables and the use of indexing to retrieve data from them.

"Closed Subroutines," the fourth module, shows how to increase productivity by creating and reusing subroutines to handle specific tasks.

The modules are available under various rental agreements, Edutronics said from 3435 Broadway, Kansas City, Mo. 64111.

Course Covers VS Concepts

ARLINGTON, Va. — Described as a comprehensive course of instruction that provides application programmers and systems analysts with the education they need to take advantage of IBM's VS environment, "Program Design for VS" is now available from Morino Associates, Inc.

The course covers the concepts and mechanisms of VS programming as well as effective design and coding strategies and guidelines.

Instructor's Guide

An instructor's guide for each module states the module's purpose and suggested timing and contains an outline of the material, explanations of the visuals provided and a detailed list of resources and references for the instructor, a spokesman said.

The Morino "package" includes the instructor's guides, student workbook and duplication rights to the materials.

It costs $1,800 and can be ordered from Suite 101, 1401 Wilson Blvd., Arlington, Va. 22209.

Rapidata Extends X2C

FAIRFIELD, N.J.— X2C, the high-level language for managing sequential or structured data bases on the Rapidata, Inc. remote-computing network, has been enhanced through the addition of automatic file input and transaction processing capabilities, the vendor said from 20 New Dutch Lane, Fairfield, N.J. 07006.

MVS Measurements Shown By Version of 'Plan IV'

PHOENIX — An update of an OS and OS/VS system performance measurement package from Capex Corp., Plan IV:MVS is said to provide installations using IBM's Multiple Virtual Storage (MVS) environment with the information needed for effective decisions at all levels of management.

Using data from facilities already built into most MVS systems — including SMF, MF/1, RMF1 and RMF2 — the package creates files and reports to highlight both past experience and future expectations.

The monthly trend report, for example, shows data for the most recent 13 months and a projection for the next half-year, a spokesman noted.

Another of the standing reports, an analysis of critical programs, lists the top 30 jobs and programs in 20 different categories.

Ad Hoc Reports

In addition to a series of reports produced regularly, Plan IV:MVS generates 34 analytical reports covering a time frame of up to 24 hours on an as-needed basis, the spokesman said. They provide support for capacity planning, service balancing and performance tuning, he added.

The package costs $12,000; lease and rental plans are available, Capex said from 2613 N. 3rd St., Phoenix, Arizona 85004.

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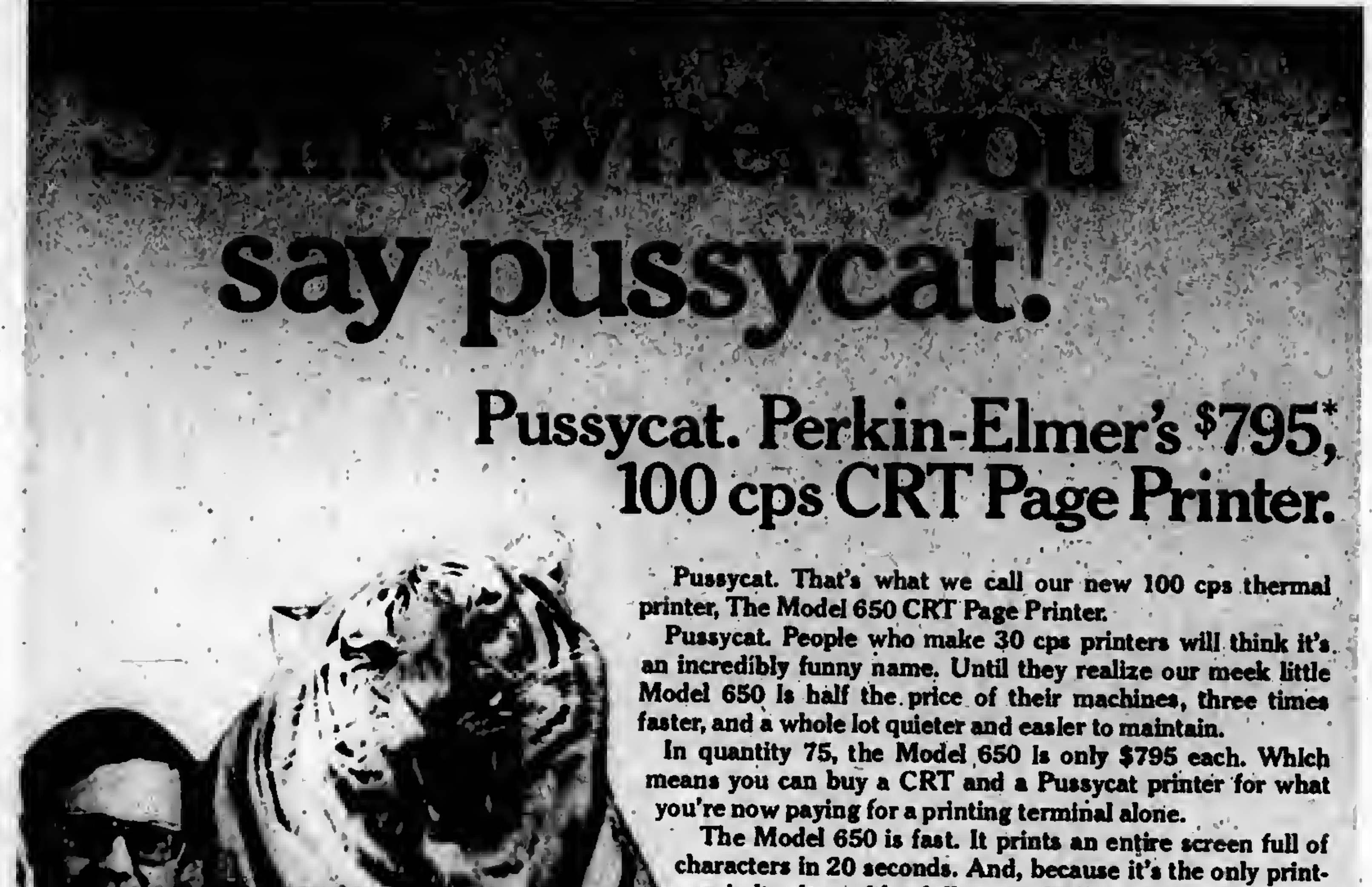

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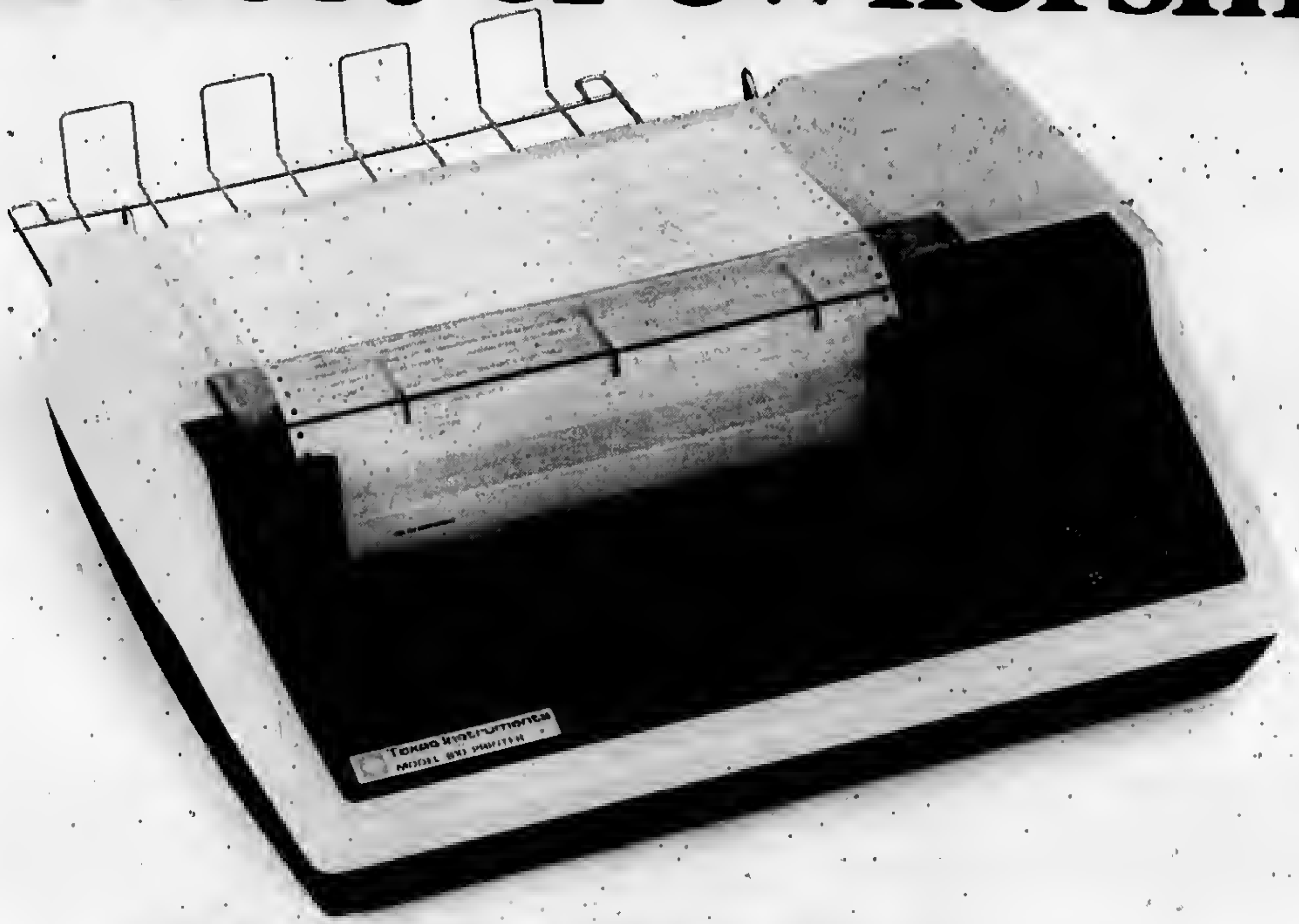

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TEXAS INSTRUMENTS.

In Ansi Paper

Datagram Network Interface Supported

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — A datagram interface standard should be developed as an addition to the X.25 standard covering public packet data networks, according to a recent survey of U.S. network experts.

The survey was conducted by Task Group 7 of the Ansi X3S3 study group on public data networks and was sent to those listed on the X3S3 mailing list last August.

The present format of the X.25 standard adopted recently by the CCITT includes only a virtual circuit interface. But as a result of the survey, the Ansi U.S. study group is now recommending that the X.25 specification be "augmented" to incorporate a datagram mode of operation at level 3, the packet level.

Of the 19 respondents to the datagram survey, 15 agreed that a datagram service should be provided on public data nets, and there was general agreement that this should be provided on an international basis, along with a virtual circuit service.

Although many applications were mentioned that would be suited to operate on a datagram service, those mentioned most were electronic funds transfer, point of sale, transaction inquiry/response and network interworking.

Fourteen of those responding favored structuring the datagram interface standard onto the X.25 standard and this will be sent to CCITT as a formal recommendation.

Of those taking part in the survey, 10 represented the user community, five were from equipment vendors, and four were from common carriers.

Complementary Services

In supporting documents, the X3S3 paper defined the characteristics of datagrams as compared with virtual circuits. While virtual circuits are entities that have duration in time, datagrams have duration in data space. While the two are qualitatively different, they can provide complementary services, the Ansi document said.

Four basic assumptions were made with regard to datagram service. A datagram will be handled by the network as a "fully self-contained packet"; it will require a minimum of network functions; it will be used for interactive-type network traffic; and packet length will be appropriate for a "screen-oriented dialogue system."

Datagram service is organized around messages that are complete in themselves and are unrelated to other messages in transit between data terminals. Virtual circuit service is organized on the concept of providing service over a period of time during which one or more packets of information can be ex-

(Continued on Page 32)

DG Micronova Family Gets Communications Enhancements

WESTBORO, Mass. — Data communications enhancements for the Micronova family of 16-bit Nova-compatible microcomputers have been released by Data General Corp.

This range of hardware interfaces, software support utilities and communication packages gives users the ability to implement asynchronous and synchronous protocols and run DG's RJE80 (IBM 3780/2780) and IBM Hasp II emulation packages on a microcomputer system, the firm said.

Hardware consists of board-level components — an asynchronous muiltiplexer, synchronous line controller and cyclic redundancy check (CRC) generator — that plug directly into the Micronova chassis. DG's Communication Access Manager (CAM) provides software support along with the emulation packages, the firm said.

This combination of hardware and software support reportedly allows the Micronova to operate as a terminal concentrator, terminal cluster controller and as an intelligent terminal with extended communications capabilities. The communication subsystem, a subset of the Nova/Eclipse Communications Subsystem also makes it possible to configure data networks.

The Model 4226 synchronous line controller interfaces to medium-speed (9,600 bit/sec) synchronous/bisynchronous communication lines. It provides a full- and half-duplex EIA RS-232C/CCITT V.24 interface and full character buffering on reception and transmission. The 4226 costs $400.

Both idle and sync characters, as well as character size, parity and loopback testing are program-selectable. In the receive mode, Model 4226 automatically synchronizes data and then strips out the sync character. When coupled with the optional Model 4228 hardware CRC generator (priced at $250), the synchronous line controller can select either of two standard check polynomials — CRC16 or CCITT16, the company said.

(Continued on Page 32)

PDP-8/A Gains CRT Interface

MAYNARD, Mass. — A CRT interface/controller permitting single or multiple standard CRT monitors to be interfaced to the Omnibus of a PDP-8/A processor is available from Digital Equipment Corp.

Designated the VK8-A, the interface/controller permits more flexibility in configuring custom CRT systems and has the capability for keyboard printer and control signals, DEC said.

The VK8-A converts Ascii data into a composite CRT signal capable of being displayed on any CRT monitor conforming to the 525/625 line television standard, a spokesman added.

A total of 127 different displayable characters, including both upper and lower case Ascii sets, can be displayed by the interface; characters are generated in a 9 by 7 matrix for upper case and a 9 by 9 matrix for lower case.

The CRT presentation totals 1,920 characters, displayed in 24 rows of 80 characters each, and is held in a memory on the interface/controller. Up to 16 VK8-As can be put on a PDP-8/A computer.

Provisions that permit the user to develop a customized CRT terminal I/O system, such as keyboard input, printer output, sense line and output line connections, are standard features. CRT monitors located as far as 1,000 feet can be driven by the VK8-A output, DEC said.

The VK8-A is said to give PDP-8/A users an increased degree of flexibility in communication to and from their computers. The VK8-A permits the establishment of multiscreen presentations of output from a computer system, a capability that is useful in applications where people in a large area, such as a school or airport reservation counter must be able to see simultaneous presentations of data, the spokesman said.

The VK8-A permits four modes of character presentation. A character may be seen as "normal" — standard brightness — dim, blinking, or underlined. Improved resolution of the characters makes the VK8-A suited to drive monitors with screens larger than those normally associated with CRT terminals, DEC said.

The VK8-A costs $995, the company said from Maynard, Mass. 01754.

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DG Enhances Communications for Micronova

(Continued from Page 31)

Standard modem control is supplied for Bell 201, 203, 208 and 209 series data sets. This synchronous controller also supports IBM Bisynch protocols with full transparency and is program code compatible with the SLM-2 Series synchronous multiplexer used on Nova and Eclipse processors.

Up to four controllers can be configured with a single Micronova microcomputer allowing it to control a maximum of four synchronous lines. However, only one CRC generator board is needed per system, DG said.

The Model 4227 asynchronous line multiplexer controls up to four asynchronous communication lines. Each line can be configured for RS-232C or 20-mA current loop operation and individually programmed for number of bits per character (5 to 8), number of stop bits (1, 1.5 or 2), line speed 50 bit/sec to 9,600 bit/sec) and parity (odd, even or none). When enabled, parity is automatically checked/ generated on each line, the firm noted.

The asynchronous hardware supports full- and half-duplex operation. It reportedly provides full character buffering on reception and transmission, program-controlled loopback testing and modem control with automatic-answer capabilities for Bell 103, 202 and 212 Series data sets.

A Communications Access Manager (CAM) provides software support for the Micronova communications subsystem. CAM, operating under the diskette-based Disk Operating System (DOS) and Real-Time Operating System (RTOS), supplies a utility for implementing application programs requiring asynchronous teletypewriter and synchronous/bisynchronous (including IBM Bisynch) protocols. It also includes Comgen, a utility that allows the configuration of communications software via an operator console dialogue. CAM is available for a license fee of $100.

In addition to CAM, separate software emulation packages let the Micronova communicate with any DG or IBM host processor using DG's RJE80 or (IBM 2780/3780) or IBM Hasp II workstation protocols. Implementation of these remote-batch capabilities provides users with a range of standard communications facilities across DG's product line, the firm said.

RJE80 supports single-stream remote job entry tasks, while a Hasp II RJE workstation multileaves up to seven input and seven output data streams for maximum use of system resources. RJE80 costs $1,250 while Hasp II carries a $1,500 license fee.

Both emulation packages allow batch terminal systems to send jobs to remote systems (IBM 360/370 compatible systems or other Micronova, Nova or Eclipse systems) for processing and to receive data files for printing or storing at the local site. Both also check data validity using a CRC-generated block check character and employ data compression techniques to improve line utilization, the firm said.

First deliveries of communications enhancements are scheduled in 90 days, from Data General, Route 9, Westboro, Mass. 01581.

Standard Urged By Net Experts

(Continued from Page 31)

changed in a sequential fashion between data terminals.

A datagram service would lend itself to transaction-oriented applications because it does not require the set-up and clearing procedures needed with virtual circuits. "Depending on the application, the use of permanent virtual circuits may be prohibitively expensive," the Ansi document said.

Because the datagram service would treat each datagram independently, the network users would be free to construct protocols at level 4 (of X.25) which employ a variety of criteria for packet ordering and processing without the delay overhead of explicit sequencing by the public data network, the paper said.

Datagram traffic can be freely routed across any available link to "multihomed hosts" through any series of internetwork gateways without the need to maintain state information relating datagram packets to each other at source or destination data communications equipment.

For user applications not requiring network sequencing, networks would have a wider range of routing options and could enhance their transparency to intermediate failures with a datagram service, the paper said.

Interconnection of public data nets with private, local nets would be considerably simplified through the use of a public network datagram mode of operation. There would be no need for the gateways between private nets and public nets to set up and clear virtual circuits with a datagram mode.

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Coupler Bows

IRVING, Texas — Vardon & Associates, inc. has introduced the TC3002, a hard-wired acoustic coupler/modem.

The TC3002 provides both originate and answer modes and operates at data rates to 300 bit/sec.

The unit is said to provide asynchronous operation with phase-coherent FSK modulation, full- or half-duplex, acoustic or Data Access Arrangement (DAA) transmission over the dial-up telephone network and feature signal/noise ratio carrier detect circuitry that suppresses erroneous or false data.

The TC3002 carries a one-year "unconditional warranty." It costs $235 from Vardon, 930 N. Beltline, Irving, Texas 75061.

NCR Introduces Two Models

Retail System Features Modularity

DAYTON, Ohio — NCR Corp. has introduced the 2140, a retail terminal system with modular technology that reporteldy allows the user to tailor equipment features and upgrade capabilities as the need arises.

The flexibility of the 2140 system derives from its modular design, which in turn is based on the use of advanced microelectronic components, NCR said.

Instead of using a single microprocessor to control all of its functions, the 2140 can employ several — each doing a specialized task, yet working with the others as part of the total system, a spokesman explained.

NCR-developed microprocessor and memory devices on a single circuit board provide basic transaction processing and cash control features in the 2140 family.

When the retailer wishes to add greater performance, such as the ability to record data on magnetic cassette tapes so it can be automatically processed later, all that is required is the insertion of a second circuit board in the system and plugging in the required peripheral, NCR said.

Other performance features, such as the ability to automatically read merchandise tags with a scanning device or the ability to automatically read information encoded on the magnetic stripe of a plastic card, can be added in the same manner.

These additional "performance modules" reportedly include:

- Data communications to a DP system at another location.
- Data consolidation, in which one "master" terminal automatically summarizes totals for up to 15 other units connected with it.
- Memory capacity up to 128K bytes (large data memory in a single terminal can be shared by other 2140s linked with it).
- Electronic funds transfer transactions.
- Up to three printing stations.

The 2140's design conforms with NCR's recently announced Distributed Network Architecture. "This will result in future tangible savings in communications costs to 2140 users," the spokesman said.

The first two models of the 2140 family are for general-purpose use. The basic version of the first model, the 2140-2000, features a 17-column, twin-station alphanumeric printer for journal, receipt and forms validation, the choice of two display panels and up to 50 totals. Prices for the 2140-2000 begin at $1,995; first customer deliveries are scheduled for later this month.

Basic versions of the second model, the 2140-7000, offer additional features including a choice of printer combinations, larger electronic memory providing up to 225 totals and the ability to display instruction messages to lead operators through complex transactions.

Prices of the 2140-7000 start at $2,495. Customer deliveries are scheduled to begin in the first quarter of 1978.

The 2140-2000 model can be upgraded in the field to a 2140-7000, NCR noted. Additional capabilities such as communications or automatic wand reading can be added to basic versions of the 2140 as needed — either when the terminal is installed initially or at any future time.

The general-purpose 2140 systems are said to "complement" NCR's current line of electronic cash registers — the 210, 220, 225, 2135 and 250.

GIC Adds Two POS Offerings

NEW YORK — General Instrument Corp. (GIC) has announced two additions to its Unitote/Regitel electronic point-of-sale (POS) systems.

The products are the Model 651 remote store controller and the Model 655 backup data capture unit.

The Model 651 provides POS capabilities for stores previously considered too small to support a full-scale minicomputer-based system, GIC said. The Model 655 was designed to provide "a third level of assurance" to the process of capturing retail sales data, a spokesman said.

The basic system price for the remote store controller, Model 651-20P, which can handle up to 20 POS terminals, is $11,800. The basic system price for the Model 655 is $10,000.

GIC is at 1775 Broadway, New York, N.Y. 10019.

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Datapoint Users Get Multiterminal Emulation

SAN ANTONIO, Texas — Datapoint Corp. has released the Multiple Terminal Emulator (MTE), a software program designed to provide users with a flexible data communications system.

MTE can be executed on any Datapoint 1100, 2200, 5500 or 6600 disk- or diskette-based processor with at least 16K bytes of memory; it enables the system to emulate most IBM remote job entry terminals including Hasp, RES and JES workstations, Datapoint said.

MTE combines the similar disciplines of most emulators into one common system so that a more uniform operating procedure is possible, a spokesman said.

This allows an easy transition between the different types of emulators that can be utilized and minimizes the time it takes to train personnel to operate the system, he said.

In a typical implementation of MTE, the operator keys in data to update or produce data files. When this data is ready for transmission to the mainframe, the operator types in "MTE" to have a menu screen displayed. This allows the choice of emulator to be made by a keyboard entry.

Assigns Peripherals

The assignment of peripherals is also accomplished by means of keyboard instructions. This provides for quick modification of system configurations and allows peripherals to be assigned according to the requirements of the job to be performed, rather than according to the special requirements of the terminal emulated, Datapoint claimed.

For instance, data which would normally be routed to a printer using IBM 3780 protocol can be assigned, using MTE, to a magnetic tape drive for processing of data before it is routed to the printer.

MTE will operate at speeds of up to 4,800 bit/sec on Datapoint 1130 and 2200 processors using either the 9404, 9405 or 9481 communications interface and the appropriate communications modem.

Using the 9481 interface with the Datapoint 1150, 1170, 5500 or 6600 processor, MTE can operate at speeds of up to 9,600 bit/sec. MTE will execute at up to 4,800 bit/sec on these same processors when they are equipped with the 9404 or 9405 interface, Datapoint said.

Three Implementations

MTE can be implemented by any one of three methods, the spokesman noted. Datapoint's Disk Operating Sytem (Version 2.4), which is necessary for MTE operation in any mode, can be used to initiate the emulator package in a point-to-point system.

MTE can also run under either partition of the Partition Supervisor, a program which allows two programs to be executed at once. When executing MTE under the Partition Supervisor, a 5500 or 6600 processor (with either a 9404, 9405 or 9481 communications interface) is required, the company said.

Another method of implementing MTE is through the Chain facility, a job control library function wich is used to execute MTE sequentially with other programs.

The Chain facility — along with the Auto-Call, Auto-Answer and Auto-Disconnect features provided — allows MTE to run in an unattended mode when executed as an IBM 2780, 3780, 2770 or 3770 terminal.

This feature not only allows for the unattended transmission and reception of files during off-hours, but also permits the user to take advantage of processor and telephone facilities during those hours when they would otherwise remain idle, the spokesman said.

The MTE software is available for a one-time distribution charge of $45 from Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

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Net Design Seminar Slated

NEW YORK — A three-day seminar titled Computer Communication Network Design and Analysis will be presented by Columbia University on March 13-15 in New York and May 15-17 in Chicago.

The seminar reportedly offers an exploration of aspects of network design that are applicable to computer and multipurpose data networks. The program confronts major design questions relating to entry and combining of messages into networks from many different terminals as well as the problems of transmitting messages to remote locations.

Specific seminar topics include examples of networks, capacity assignment in networks, cost trade-offs, elements of queueing theory, concentration and buffering in store-and-forward networks, centralized network design, routing and flow control, polling, random access techniques and line control procedures.

The seminar leader is Dr. Mischa Schwartz, professor of electrical engineering and computer science at Columbia University. Details are available from the New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

IBM vs. AT&T to Be Datacomm 78 Topic

WASHINGTON, D.C. — The long-term strategies of IBM and AT&T — and the collision course those strategies seem to signal — will be the focus of a presentation at Datacomm 78 to be held Feb. 21-23 at the Sheraton Park Hotel here.

Charles P. Lecht, president of Advanced Computer Techniques and author of the forthcoming book *The Waves of Change,* will discuss the "impending clash" between the two giant corporations and explain why and how he feels either side could win that confrontation.

Following his presentation at Datacomm 78, Lecht will participate in a panel discussion with John Eger, former head of the federal Office of Telecommunications Policy and now a consultant on communications law and regulatory policy; Frederick C. Withington, computer industry analyst with Arthur D. Little Corp.; and E. Drake Lundell Jr., editor of *Computerworld.*

Session topics at Datacomm 78 include data communications network architecture, network security, data communications software and product trends in such areas as modems, multiplexers, facsimile systems and data entry.

Details on program topics and registration information is available from The Conference Company, 60 Austin St., Newton, Mass. 02160.

Interdyne Offers Buffered Device

VAN NUYS, Calif. — An intelligent buffered data terminal, Model ICS 3801, is being offered by Interdyne Co. It uses an Ansi/Ecma Philips cassette drive and is RS-232C compatible. It has an editable data buffer that holds up to 260 characters, a block rewrite capability and allows insertion of blocks or entire paragraphs into previously written text.

Features include .5M byte of storage per cassette, switch-selectable asynchronous transmission rates from 110 bit/sec to 19.2 kbit/sec, Ascii text as well as transparent binary modes, fixed or variable block length and auto error check and retry.

The ICS 3810 is designed for connection to printers, CRTs, modems, computers or other terminals. It costs $1,950 from Interdyne Co., 14761 Califa St., Van Nuys, Calif. 91411.

Correction

The manager of information services for Korvettes [CW, Nov. 28] is Morton Weitz.

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Terminal Offers Two Languages

BOHEMIA, N.Y. — Megadata Corp. has introduced the 700/DL, a dual-language terminal it said can operate in English plus "any other language" such as Cyrillic, Farsi, Hebrew or German.

"Dual-language" does not simply mean two character sets are displayed on the same display screen; it requires the display of both languages with all the text-writing requirements for two totally different written languages, the firm claimed.

Both character sets are of sufficient quality that a readable English/foreign language font is displayed, according to a spokesman.

Entering Data

Another feature of the 700/DL is the ability to enter data from right to left or left to right, the company said.

Characters are displayed in a 10 by 15 matrix, and the terminal is said to include necessary insert, delete and text-editing features. The 700/DL features a memory of up to 73K, a 126-station keyboard, a 15-in. diagonal display and transmission rates from 50 bit/sec to 38.4 kbit/sec, the spokesman noted.

The dual terminal is reportedly available with interfaces and protocols for most popular mainframe computers. It costs $5,800 to $6,850 depending on quantity. Megadata is at 35 Orville Drive, Bohemia, N.Y. 11716.

Recorder Includes Rate Converter

BALTIMORE. — Columbia Data Products, Inc. has introduced a data cartridge recorder with a built-in transmission converter.

The Model 300C was designed to connect between a modem/CPU and a terminal with an on-line/off-line storage capacity of 1.5 million characters.

The 300C is equipped with dual RS-232 ports and a 512-character buffer to accomplish the rate conversion, according to a spokesman.

Speeds are selectable from 110 bit/sec thru 19.2 kbit/sec with current-loop capability in the terminal port, he added.

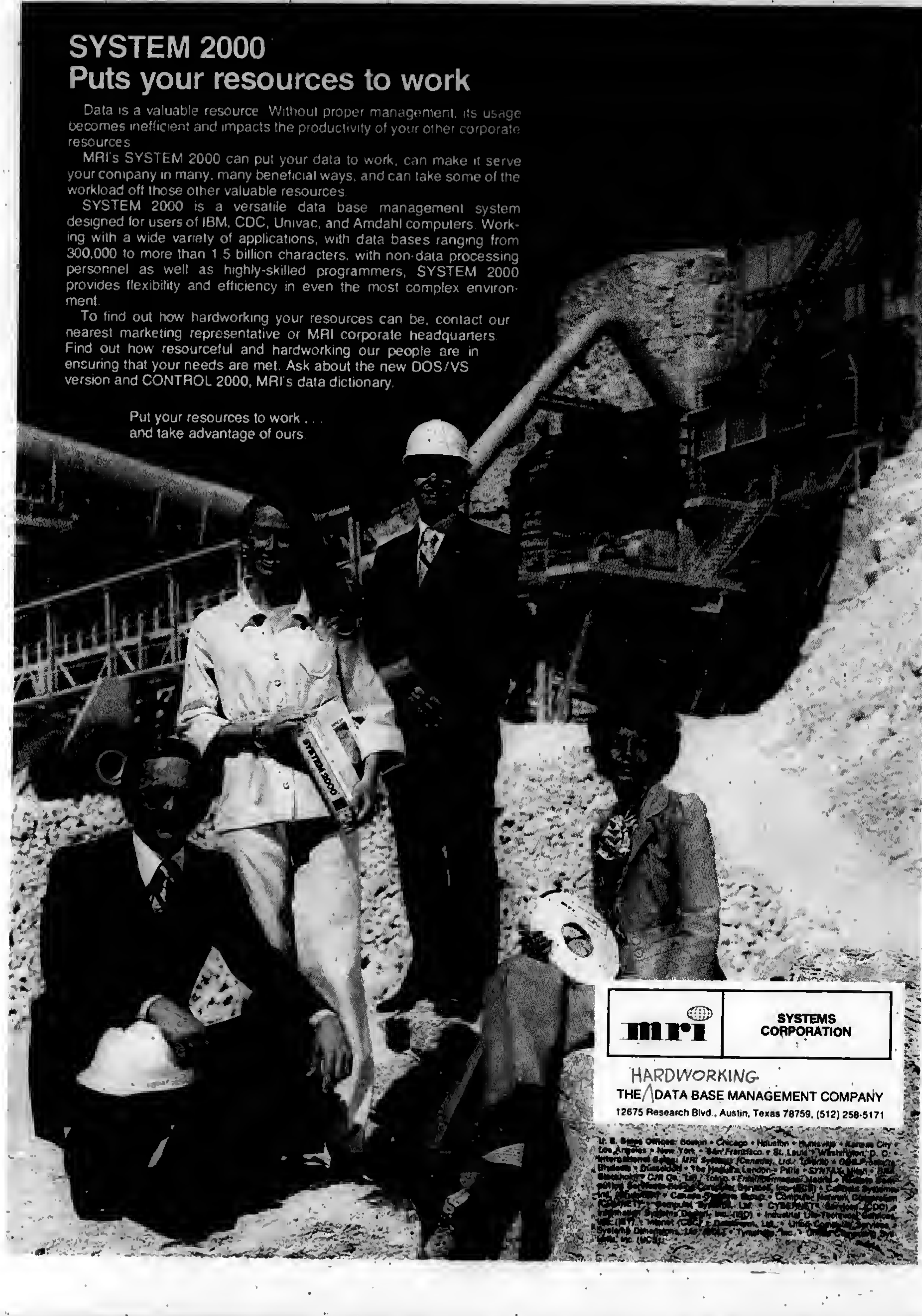
In the on-line mode, characters received on one port are immediately retransmitted on the other port at the preselected baud rate. In those cases where a large amount of data is to be transferred, the data can be written on tape and then transmitted.

Design of System

The system was reportedly designed for connecting a slow terminal to a high-speed computer while providing a reliable storage device.

The 300C can be controlled remotely by using Ascii control codes or manually with front panel switches and numerous status indicators, the spokesman said.

Optional features include auto answer, Bell 202 modem controller, rack mount, 220 Vac and customized software. The unit costs $1,995 from Columbia Data Products, 6655 Amberton Drive, Baltimore, Md. 21227.



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Cuts Divisional Costs

Corporation Centralizes Data Entry Task

BARBERTON, Ohio — Five Babcock & Wilcox divisions, each with its own computer or on-line access to a central computer, are using a centrally located key-to-disk data entry system to lower the cost of preparing batch material for processing.

"While it is impossible to say exactly how much this saves, it probably totals thousands of dollars a month in personnel and hardware costs that the individual divisions otherwise would have to spend," according to Data Entry Supervisor Anthony Stock.

Babcock & Wilcox (B&W), a manufacturer of power generating systems for public and private utilities, is in a unique position to establish this centralized data entry arrangement, since the five divisions are situated close to each other. Two divisions, Fossil Power Generating, Nuclear Equipment and Group Staff departments, all are located in the same facility here, while the other two, the Construction division and Industrial and Marine, are no more than 10 miles away.

"Companies or divisions with computers distributed throughout different departments also can benefit from this arrangement," Stock added, "particularly those now using keypunch machines for data preparation."

With the centralized system — based on Inforex 1303 units — B&W also has reduced data entry costs $6,000 a year while speeding data preparation time some 10%, he added. Half the dollar savings, he explained, has come from a reduction in previous keypunch and disk-to-tape hardware cost, the other half from the elimination of punched cards and the need for a second shift.

The improvement in data entry speed, he continued, is attributable to automatic generation of format codes, which means keyboard operators need not include program instructions along with source material, and to the replacement of mechanically based keypunch machines with the all-electronic system.

"With centralized data entry, turnaround time is almost the same as if data were entered and transmitted through remote job entry to B&W's IBM 370/158 mainframe," Stock stated. "Source material hand-delivered or mailed each day by the different divisions to the Inforex system is immediately entered, then processed and printed — usually on the same or the following day."

On an average day, upward of one million keystrokes are performed on the system, Stock noted. All the data is placed initially on Inforex disk, from which it is then transferred to 9-track, 800 bit/in. tape.

"What is physically entered at a keystation and what ultimately is released on tape for processing is entirely different, however, in respect to the way data is arranged," Stock said.

"With a keypunch system, each operator has to maintain a set of program cards, then select the proper card for each job entered. Finding the right card sometimes can take a minute or longer; sometimes a card is wrong and the job has to be repeated," he said.

If incorrect information is punched on cards, duplicate cards with the correct information have to be punched and fed manually into the deck — a very time-consuming process. However, these corrections can be made in seconds with the Inforex system, Stock said.

"All we have to do is call up the appropriate program, make the change, then let the system do the rest," he pointed out.

Before installing the Inforex 1303 in August 1975, B&W used 10 Mohawk Data Sciences Corp. key-to-tape stations, seven Univac 1710 and eight IBM 129 buffered keypunches for centralized entry of batch information.

"Recognizing that we might encounter some transition problems, we limited this initial Inforex installation to one controller and eight keystations and used it in conjunction with our other data entry devices. In December 1975 we added another 1303 controller and eight more keystations," Stock stated.

Five divisions of Babcock & Wilcox are using a centrally located key-to-disk data entry system.

"By April, 1977, we had added another 1303 controller, six more keystations (bringing the total to 22), dropped the remainder of the previous hardware and switched from an 18-person first shift, six-person second shift to a 22-person, single-shift operation."

Stock noted this reduction in hours did not occur because of any major reduction in volume of jobs or any change in the data submission schedule of the different divisions. "The ability to accommodate different types of information through the system was just that much faster," he said.

"For example, using an Inforex keystation, an average operator can generate approximately 9,000 keystrokes an hour and an experienced operator about 14,000. Using a keypunch station, an average operator can produce only about 7,000 keystrokes an hour and an experienced operator about 11,000."

College's System Pools Student Records

SYRACUSE, N.Y. — Syracuse University here has consolidated its student information into an integrated on-line records system that lets university personnel provide immediate answers to questions about grades, admissions and finances.

The system makes it possible for prospective students to learn the status of their applications by telephone in seconds. It also lets confused freshmen have errors on class schedules corrected immediately, and apprehensive students can be reassured sooner about the status of their applications for financial aid, according to Thomas F. Benzel, manager of student data systems.

The system maintains a student's records from the time of application through graduation. Besides maintaining records for the admissions, registrar's and financial aid offices, sections of the system support the administrative work of the various schools and colleges at the university.

Benzel said the frustration of students attempting to find answers and employees trying to provide them has been substantially reduced. And the system, which took 2-1/2 years to design and implement, has many far-reaching effects.

"I'm very proud of what we've done," Benzel said. "As far as I know, no one else has undertaken the whole reorganization of a student recordkeeping system in just two years."

The student is the common denominator in the system, which ties all the formerly unrelated areas together. Admissions, financial aid and the registrar's functions have been integrated, eliminating much overlap. With the old method, "once a folder got started moving, it became caught up in the bureaucratic snarl," Benzel said.

Locating the file and its information is no longer a problem.

In admissions, the new records system keeps an inventory of all the required documents and the status of a student's application is available at all times, he noted.

Benzel said the on-line system is much more convenient than the old system. Now clerks can update information by typing in changes at a CRT terminal. The changes can be checked by having the computer either display the information on the CRT terminal's screen or print a hard copy on a matrix printer in the office.

The old system used batch processing, where changes were punched on data cards and read into the computer by a card reader. Verifying changes required programming the computer to print an audit trail on a line printer located at the computing center. Errors then had to be recycled through the batch process.

When it came time to upgrade the university's student information system, a review of the former batch-processing system revealed it to be more useful as a repository for historical information than as a basis for a new information system.

HEW Grant

In 1975, a $220,000 grant from the Department of Health, Education and Welfare enabled the design of a new system that would integrate the information required for university and student records administration.

The system is based on an IBM 370/148 that contains 2M bytes of memory, a spokesman said. Peripherals include four 6250 dual-density tape drives, 10 Memorex Corp. disk drives — four single-density and six dual-density — with 1.6 billion bytes of storage area, an IBM printer capable of speeds up to 1,100 line/min and a remote job entry terminal that is kept in the programming area, he added.

"The time required to process admissions applications has decreased substantially. The processing of admissions applications is a month ahead of last year," he said.

Corrections which took all semester can now be handled at once, and the working environment is more productive and stimulating, he added.

Adding Instructional Services

Center Meets Business Needs for 700 Schools

By Tim Scannell
CW Staff

HOUSTON — A central DP center here, serving 700 public schools in Texas, uses two Control Data Corp. Cyber 172 systems for most of the schools' "business" DP needs.

The Gulf Texas Multi-Regional Processing Center (MRPC) serves nearly 700,000 students and has the most powerful computing facility, in terms of capacity and speed, of the eight centers that provide DP services to the Texas public school system, according to Arley Carter, DP director of the MRPC.

The Cyber 172s are linked and share 500K bytes of memory, a spokesman said. The system also includes shared files of 18 CDC 844-2 disk units that are capable of recording two billion characters of information and a 580-12 printer with a speed of 1,200 line/min, he reported.

Remote terminals — 235 in all — are installed in schools and district administrative offices provide about 70% of the system's input, the spokesman added.

The system is managed by a staff of 96 technical, administrative and educator personnel and is patterned after a typical business application, Carter said.

It not only handles student files, scheduling, grade reporting, attendance, test scoring and personnel accounting and payroll, but it performs research and statistical analysis, model simulations and specially formatted reports that might be required by state and federal government, he added.

The 172s are also responsible for the annual production of more than one million paychecks, and the system produces 96,000 pages of computer printout weekly for the Houston Independent School District, which includes 230 schools, he said.

Operational Since '72

Growth in computer use has been rapid since 1972 when MRPC became operational with a CDC 6600 system, according to Carter.

All of the jobs for processing, at that time, were brought to the center by a delivery service and were returned to the users a few days later, he claimed.

But as the network grew, so did the need for a larger computing facility and in 1976 the 6600 was replaced with 172s. Terminals were then utilized to achieve faster turnaround.

The system makes use of on-line application and communications between the remote terminals and the central computer, Carter noted.

"For example, daily attendance data relayed from a school's terminal to the computer is rapidly processed and the names and home telephone numbers of absent students are printed out at the school within an hour. School officials then selectively call the absent student's home for a report on his whereabouts," he said.

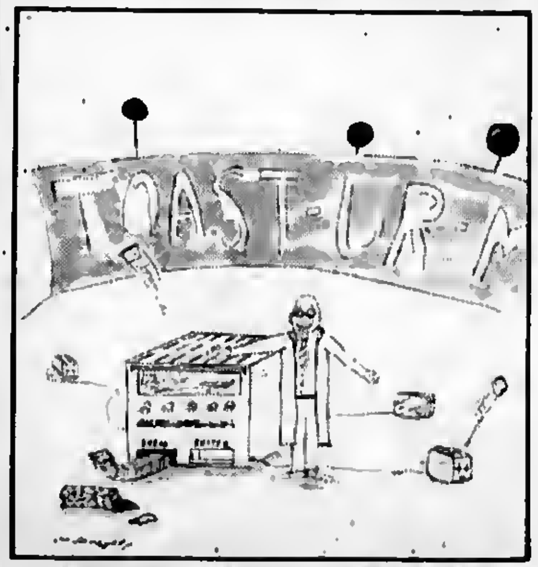
In addition to operational and management services, MRPC is moving into instructional computing, Carter said. Through the various terminals, students can participate in computer-assisted instruction, have access to vocation-counseling information and develop and test computer programs and learn the operation of computer equipment.

Teachers also benefit from the system's facilities because they are able to track a student's progress as he proceeds through a computer-assisted learning sequence and select appropriate test items from a data bank that includes instructional resources, diagnostic references and course content, Carter said.

The MRPC system has been enhanced by the installation of high-speed synchronous communications lines to large districts that have a heavy data workload. Also, in order to maintain such an extensive geographic network, with some users almost 200 miles away, MRPC uses a front-end teleprocessing minicomputer to facilitate communications, he added.

The Houston Independent School District, which is the largest, also has its own on-site CDC System 17, which is linked with the Cyber computers at MRPC. Data is put on magnetic tape at this site and then transferred to MRPC for final processing and printing, according to a spokesman.

Integration into the Cyber system eliminated the need for an IBM 370/-145 computer that was formerly used by the Houston school district. The IBM machine is slated to be moved to Houston Community College in 1978,



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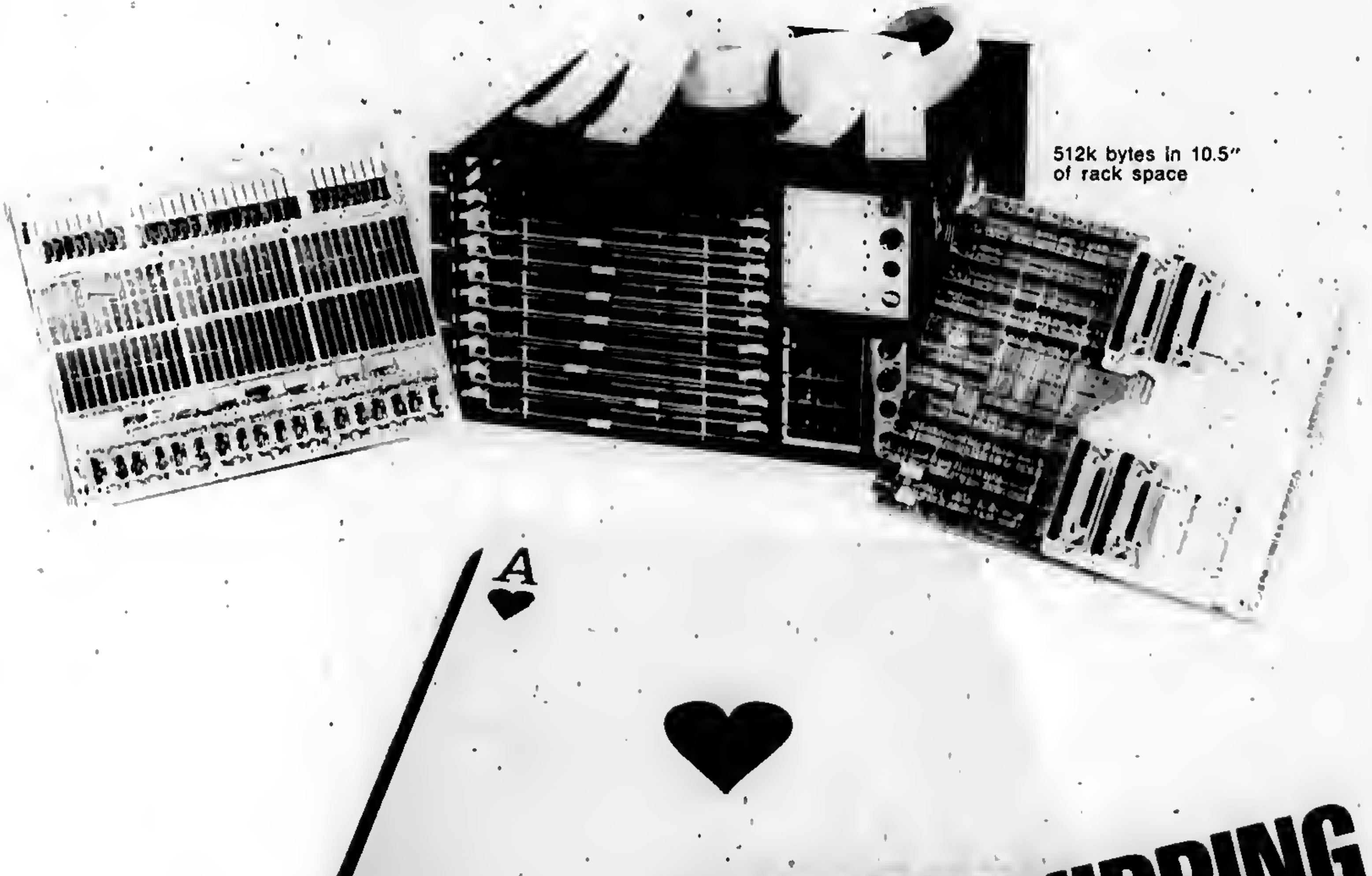

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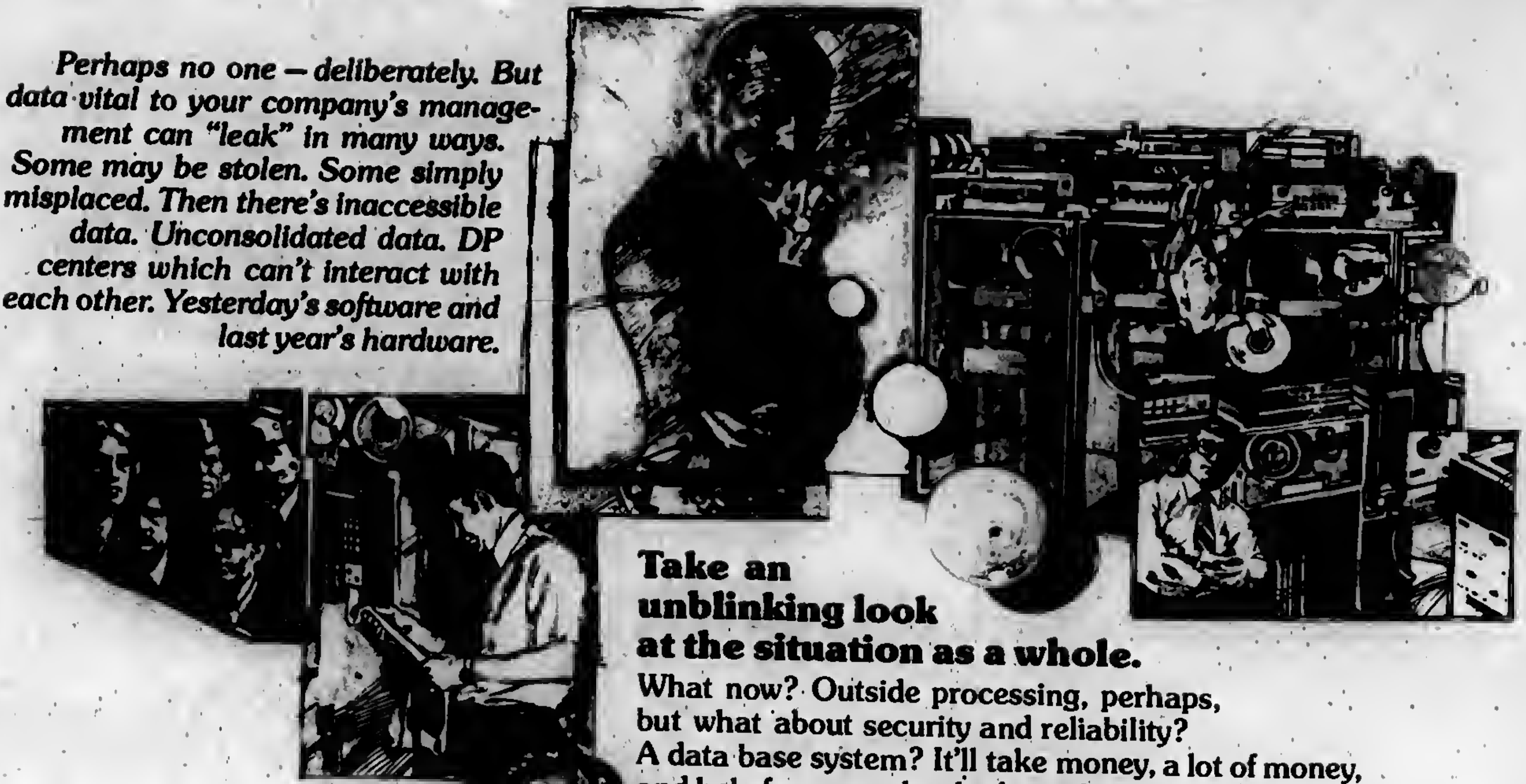

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User Credits Vendor for Ease in Four Upgrades

By Brad Schultz
CW Staff

NEW HYDE PARK, N.Y. — A private courier service which has experienced a 12-fold increase in sales over the past 11 years credited its success to staying with one vendor during its hardware growth.

Honeywell Information Systems, Inc. "has had an especially supportive attitude throughout our continuing expansion, always having the right computer system ready for us at the right time," Thomas F. McCloskey, vice-president of Puralator, Inc., said in describing the experience of Puralator's Services Group.

HIS anticipated Puralator's growth by suggesting a Model 120 in 1966, when most computer vendors saw the firm as "small-time," McCloskey said.

Handling payroll and "basic business functions," the Model 120 featured 8K words of main memory, three tapes, a card reader and a printer.

"Before that, our accounts receivable system consisted of carbon copies of invoices," McCloskey said. "Putting it all on cards made the accounting a breeze — for a while, anyway."

Three More Upgrades

Considered outgrown in 1969, the system was replaced by a Model 115 with 32K words of main memory, four tapes and a disk drive.

Two years later, the Model 115 had also been outgrown. By that time, annual sales had climbed to $82 million from $16 million in 1966. So in 1971 the 115 was replaced by a Model 2050 featuring 131K words of main memory, six tapes, four disk drives and a batch card system.

By 1974, annual sales had climbed to $148 million and 75,000 transactions per month were being processed by 22 employees. "We were always three to four weeks behind in applying a customer's payment to his account, and accuracy was becoming a problem," McCloskey recalled.

"The off-line, batch card system just got unwieldy," he said, "and we had some plans for on-line applications to serve our customers better."

The 2050 was replaced in 1975 by a 66/40 large-scale real-time system.

The 66/40 features 256K words of main memory, five 10M-byte disk drives, seven tape drives, a front-end network processor, a communications processor, a magnetic ink character reader/-sorter, a card reader, two printers and six CRTs.

Programming and development time has been reduced by 67%, McCloskey noted in comparing the 66/40 with its predecessor. "With the 2050," he added, "80% of our systems and programming department was on maintenance and 20% on development of new programs. The Level 66 reversed those figures."

According to McCloskey, the 66/40 also enabled Puralator's DP staff to drop from a 24-hour, six-days-per-week operation to a 12-hour, five-days-a-week schedule. "And we are now doing an average of nine multiprogramming jobs per month, while we were averaging 1.2 jobs before."

The company presently has 14 CRTs, eight allocated for accounts receivable and six for credit, customer inquiries and program development.

Puralator plans to use HIS equipment to implement a "shipment control system," McCloskey said.

With a terminal in each of 35 offices, "a customer could call any Puralator office to inquire into the status of a shipment, and that office would be able to use its terminal to determine within seconds where the parcel is and when Puralator will deliver it," he explained.

"But the real value of the system is that we will be able to call the customer before he calls us," he noted.

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The Tough Ones.

1. **System Down—Processor Failure.**
2. **System Down—Disc Failure.**
3. **System Down—Repairing Hardware.**
4. **System Down—Restoring Data Base.**
5. **System Down—Software Failure.**
6. **System Down—Changing to a Larger Processor.**

Lots of things change when you go "on-line." Mostly for the better. That's why this is the most important trend in data processing today. But the one area which concerns management the most is "What happens when the computer goes down?" It's a good question, and until Tandem introduced "NonStop" processing last year the answers weren't pleasant. Service is interrupted; that's bad enough. But there is worse news still. At the instant of failure, a transaction in process could be lost (or duplicated), a record being updated could be destroyed, or a pointer changed incorrectly could cause the loss of untold records. In short, loss of service is the surface cost. Loss of data base integrity is an even greater problem. Tandem's NonStop System, hardware and software, is the first top-down, designed-in solution to both these problems. To make it even better, we've designed it so it's easy to program, easy to expand, and easily the most efficient transaction processing system around.

1. System Down—Processor Failure. Every computer will fail sometime. The bigger they are, the more often they fail. Tandem has replaced bigness with a unique multiple processor architecture. Workloads are shared by the processors under control of Guardian, the only NonStop Multiple Processor Operating System available regardless of price class.
When a component fails, Guardian automatically reassigns both processor and I/O resources to ensure that in-process tasks including file updates are completed correctly. You decide the priorities; Guardian does the work. And no interruption of your "on-line" workload occurs. Restart is virtually instantaneous.

2. System Down—Disc Failure. When one of your disc storage devices fails in the middle of a file update, unknown damage to the record, to record pointers, or to indices can occur. Enscribe, Tandem's NonStop Data Base Record Manager, ensures that the damaged record is restored; and, with our optional Mirror Volume duplicate file technique, that operation is continued using the back-up file. The back-up files are created automatically and are used by Enscribe to improve system response time. When the down disc is repaired so are its files, automatically, by Enscribe. You decide which volumes to back up; Enscribe maintains them, and no interruption of service occurs.

3. System Down—Repairing Hardware. With any system, a hardware failure must be repaired. But only with Tandem can the system keep operating, right through the failure and through the repair, too. Tandem's Customer Service Representative can remove and replace any failed module in your system without interrupting service. The operators at terminals and the programs in process are totally unaware of either the failure or the repair. And routine maintenance, too, is performed with the system fully operational. This is one more unusual feature of our system, but without it, no system can truly be called "NonStop."

4. System Down—Restoring Data Base. When a hardware failure occurs during file update in any "on-line" system which is not NonStop, there is every reason to question the integrity of the data base. Integrity of the data base is crucial. For this reason, elaborate procedures to maintain restart points and backup files are required in almost all "on-line" systems. Not with Tandem. Using Guardian and Enscribe, the Tandem NonStop System ensures that all transactions are completed correctly even if a processor, I/O channel, disc controller or disc drive fails during that transaction. Equally important, the system downtime normally required for "restore" and "restart" operations is eliminated.

5. System Down—Software Failure. System software crashes are an important source of downtime in ordinary on-line systems, but not in Tandem installations. Because all Tandem software is designed and tested to run in a multiple processor environment, it is also designed and tested for failure modes never considered in single processor systems software. Most important, the use of independent processors; each with its own memory, assures that a software failure in one processor cannot cause a failure in a second processor or contaminate the data or programs executing in that processor.

6. System Down—Changing to a Larger Processor. On-line systems tend to grow, and as they grow they change. New applications, more stations, improved service; all of these result in a need for bigger, faster processors. With Tandem's NonStop System you can actually add processors, add memory, and add peripherals without any re-programming whatsoever. Using Guardian, Enscribe, and Envoy, Tandem's Data Communications method, all user programs and all files are geographically independent. They have to be for NonStop operation. You can also write your programs using a powerful high-level compiler for a multiple processor environment as easily as for a single processor.

7. System Up—Confidence Down. When an "on-line" system is up, people come to rely on it. And because today's computers are reliable, people have come to rely on them quite heavily. Which makes it even worse when the system does go down, or the information it supplies is wrong. Confidence is severely damaged. And anyone who has tried manual back-up systems knows that they are not the answer. An automatic back-up, non-stop system is the answer. And Tandem has it.

No Failures in Five Months

Bank's DP Prospers With Independent Memory

W. ORANGE, N.J. — After adding 256K bytes of independent memory to its IBM 370/145, a bank holding company here reported no memory failures during the first five months of operation.

The Midlantic Banks, Inc. boosted the memory capacity of its Model 145 from the 512K bytes originally supplied by IBM to 768K bytes with the installation of add-on memory from Electronic Memories and Magnetics Corp. (EMM)

"We needed certain capabilities from our IBM 370/145 that we just couldn't get from our existing mainframe configuration. One of our primary considerations in expanding this memory was to minimize the effect of failed memory on our operation," according to Bob Henches, assistant vice-president and manager of technical support.

When Midlantic decided to upgrade its memory, a 50% increase in capacity was considered sufficient to meet its needs. In mid-1976, the company decided to consider independent add-on memory as the best method of achieving its objectives.

"We had three primary criteria in evaluating memory. These included the performance, flexibility and price of the memory," Henches recalled.

Narrows List

Midlantic looked at the independent suppliers of 145 memory and narrowed the list to three. Two were third-party marketing companies and the third was a memory manufacturer, EMM.

Midlantic picked EMM memory because EMM "met our objectives better than the other suppliers. Its 145 memory also offered several benefits that were especially important to our operations and heavily influenced our decision," Henches added.

These benefits included the ability to dial off failing segments of memory, plus the recording of single-bit memory hits, he said.

Also important, but not a major factor in the decision to go with EMM, was the fact that EMM's 145 memory system is static, whereas the other systems at which the firm looked were dynamic devices. The use of static memory helped to ensure the compatibility, he said.

Midlantic also recognized the installation time was very important since the center is an on-line operation and it processes savings and demand deposit transactions. It is also tied in to automatic teller machines. The EMM system was installed within 24 hours, minimizing the impact on operations, Henches said.

"During the first five months of operations, we didn't experience a fallout or any time down. After nine months we had only two hits on EMM memory, with a total deviation of three hours.

"Both EMM and Sorbus [a third-party maintenance firm] have given us excellent support when we have needed it," Henches said.

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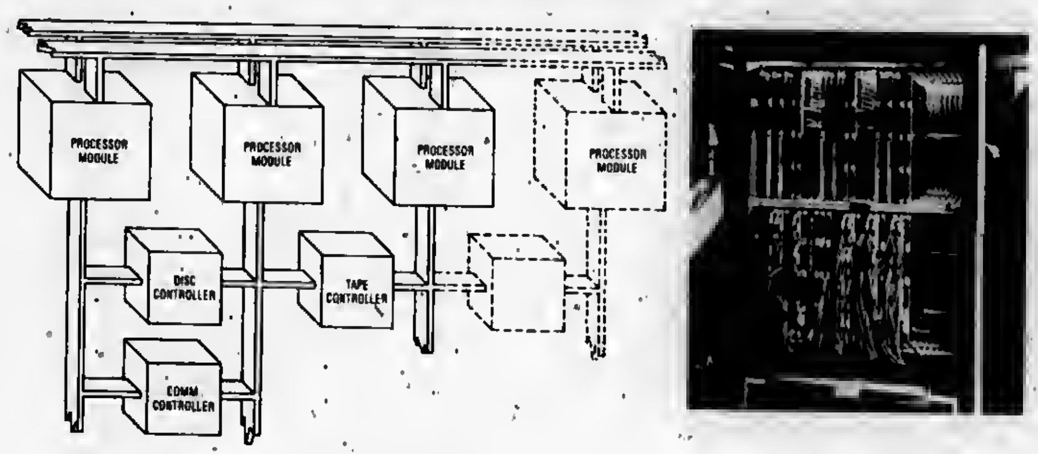
Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.



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Key-to-Disk Keeps Collector's Data Cleaner

Special to CW

PITTSBURGH, Pa. — The NUS Corp. here has made the transition from keypunch technology to key-to-disk. As a result, it reported, its data entry error rate has dropped from 30% on keypunch to about 1.5% with key-to-disk, while handling up to 780,000 data records yearly.

NUS is involved with the design, location, construction and safe operation of nuclear power plants, fossil-fuel power generating plants, mining operations and other energy-related projects because it busies itself pulling together large masses of raw data — and converting it into understandable, useful information.

NUS' Ecological Services Division (ESD) provides scientific expertise, management support and documentation for over 200 such data collection projects annually. These projects, primarily environmental impact studies and monitoring programs, involve the collection and processing of data related to everything from hydrology and seismology to physics and microbiology.

The ESD utilizes a Mohawk Data Sciences Corp. (MDS) System 2409 key-to-disk system to help assure the required data accuracy, to keep researchers abreast of current publications in their fields and to provide a data management and entry system that is the first phase in a project sponsored by the Environmental Protection Agency (EPA) to establish effluent guidelines for the iron and steel industry.

The configuration at the ESD was implemented on Sept. 1, 1974 to replace IBM 129 keypunches. It includes a 65K System 2409 used for data entry, validation, editing and concurrent remote batch communications with IBM 370/168 and 370/158 mainframes located at an outside services vendor in Pittsburgh and a Control Data Corp. 6400 in McLean, Va.

The communications links are 4,800 bit/sec dial-ups. The system also includes five keystations; four 9-track, 800 bit/in. tape drives; a 400 card/min card reader; a teletypewriter console; and a dual disk system with a combined storage capacity of 4M bytes.

Three years ago, under the guidance of Henry Hess, manager of data analysis and biostatistical studies, a state-of-the-art enchancement of MDS' Key-to-Disk Operating System (KDOS) was created to handle the division's specialized data entry requirements. The enhanced system, called Ecological Data Validation System (Edval), allows keystation operators to enter the taxonomic classifications of biological samples with a minimum number of keystrokes and, therefore, a reduced risk of error.

Essentially, the purpose of Edval is to reduce long and complex Latin names to the shortest possible unique form and to provide operators with no special training in the sciences with a means of looking up correct phylogenetic classifications.

According to Hess, "Edval and the editing and validation capabilities of the System 2409 have reduced our data entry error rate from 30% on keypunch to only 1% or 2%. Further, we have the ability to go back and update, delete or change data stored on the disk.

"That is especially important in light of the fact that new scientific discoveries and sampling methods sometimes create the need for new or modified formats," he noted.

Scientists Up-To-Date

In 1975, Hess' staff further addressed the problem of keeping pace with new developments in the ecological sciences by creating an information retrieval system on the MDS System 2490.

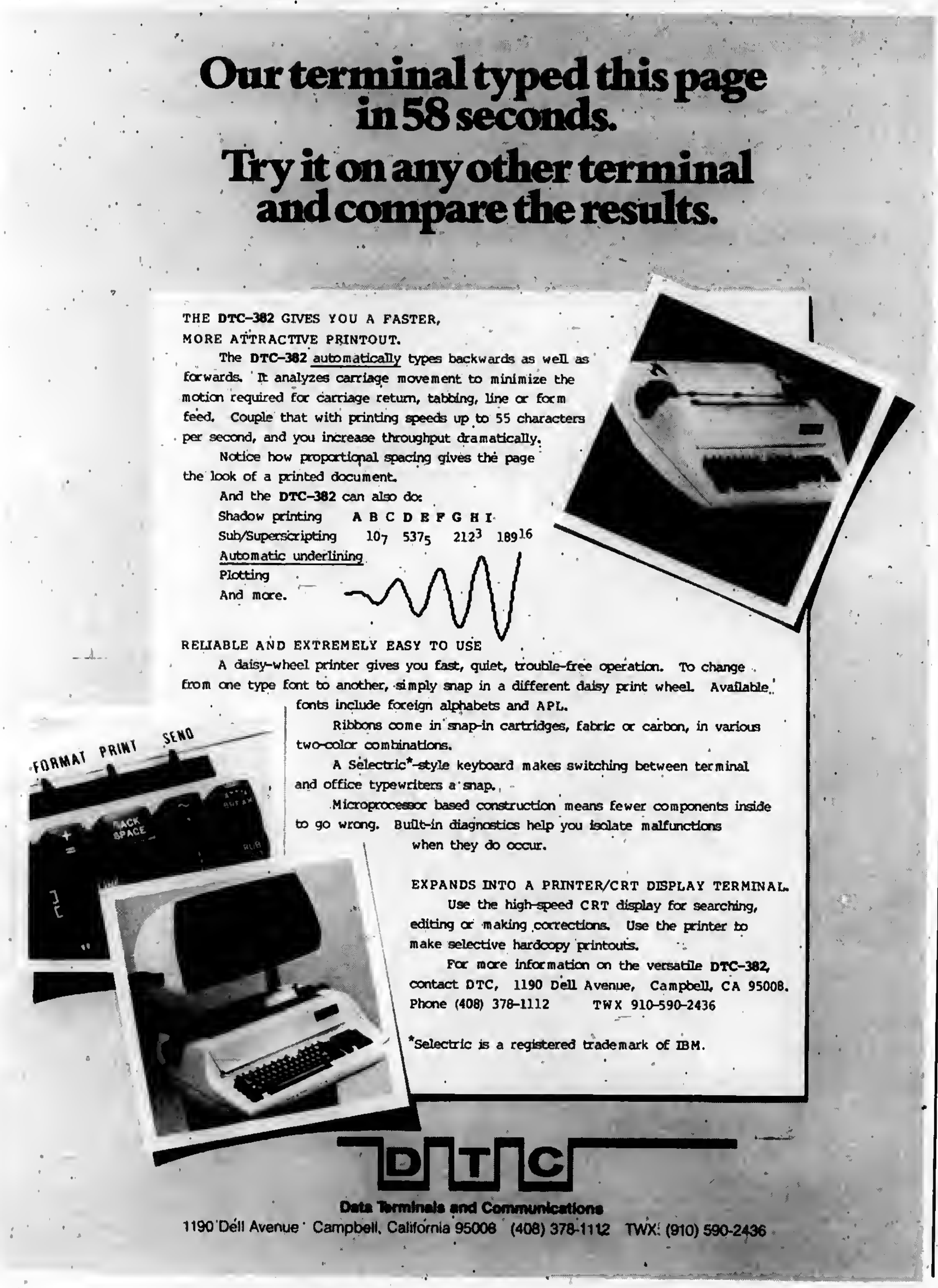
Over 8.3 million documents — reprints of journal articles, abstract sheets and technical materials — can be listed on two disks. A researcher who needs to review a specific subject area may reference as many as 20,000 key words which are included in the file and which may be modified by as many as 50 operands.

The system automatically examines 2,000 document/sec. For example, one might key in "FISH, 1974, OHIO" and get back a complete list of all publications relative to ecological studies on fish in the state of Ohio either performed or published in 1974.

A third application, implemented in May, 1977, is the first stage in a project to gather and organize data on which EPA can base effluent guidelines for the iron and steel industry. Working with the Cyrus William Rice Division of NUS in Pittsburgh, ESD created a data entry and management system to turn on the key-to-disk system.

Responses to inch-thick questionnaires sent out to management personnel in the industry are being keyed in on the system, validated, edited and batched for data management on the 370/168 in Pittsburgh. To date, over 400 questionnaires have been received and entered, and 150,000 records have been produced. The system was also used to generate mailing labels for the questionnaires.

NUS' major reasons for implementing the System 2409 three years ago were the ability to write special applications software, to achieve the data entry accuracy and productivity rates essential to valid statistical evaluation and to communicate with a variety of mainframe and peripheral devices," Hess said.



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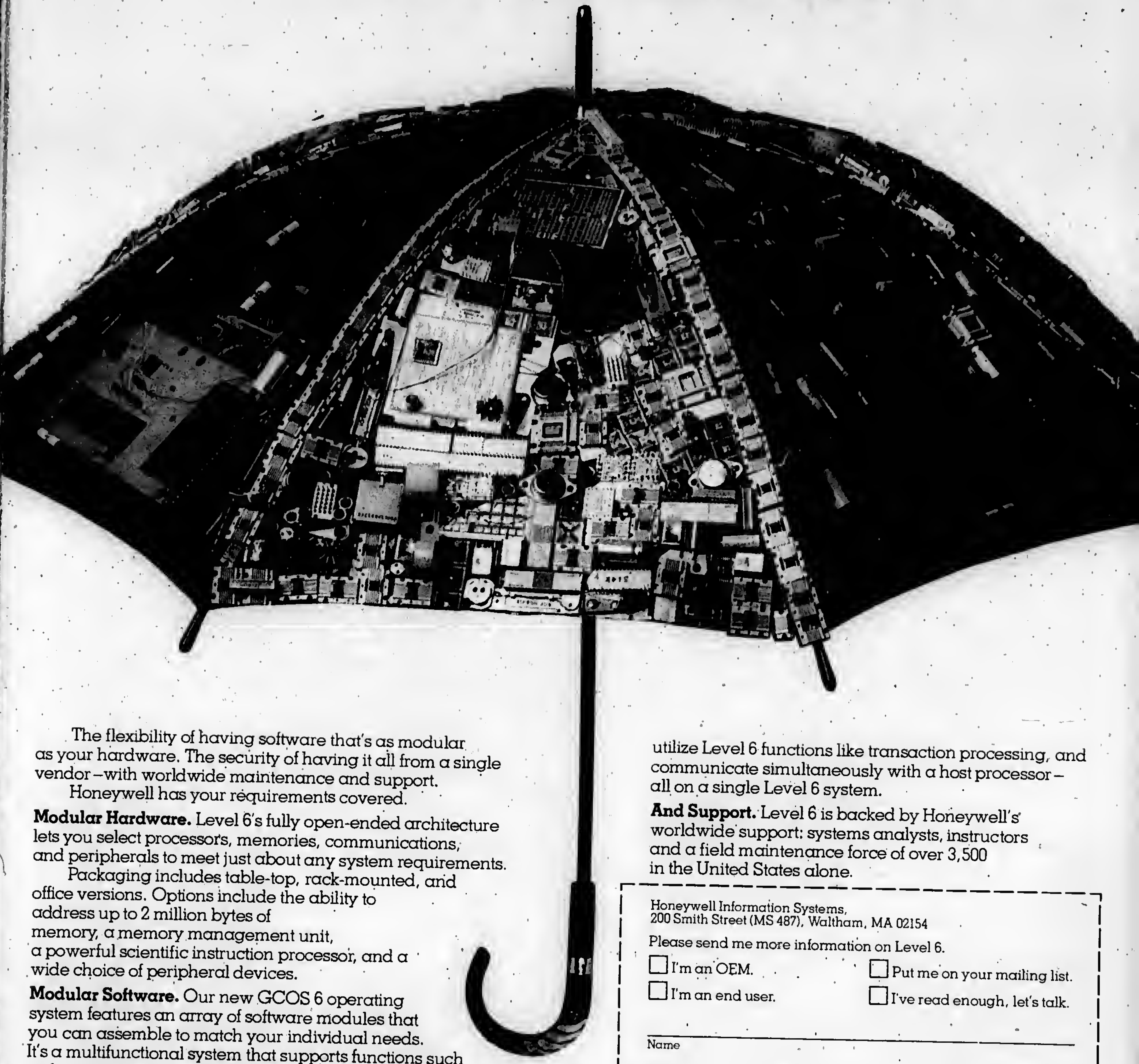

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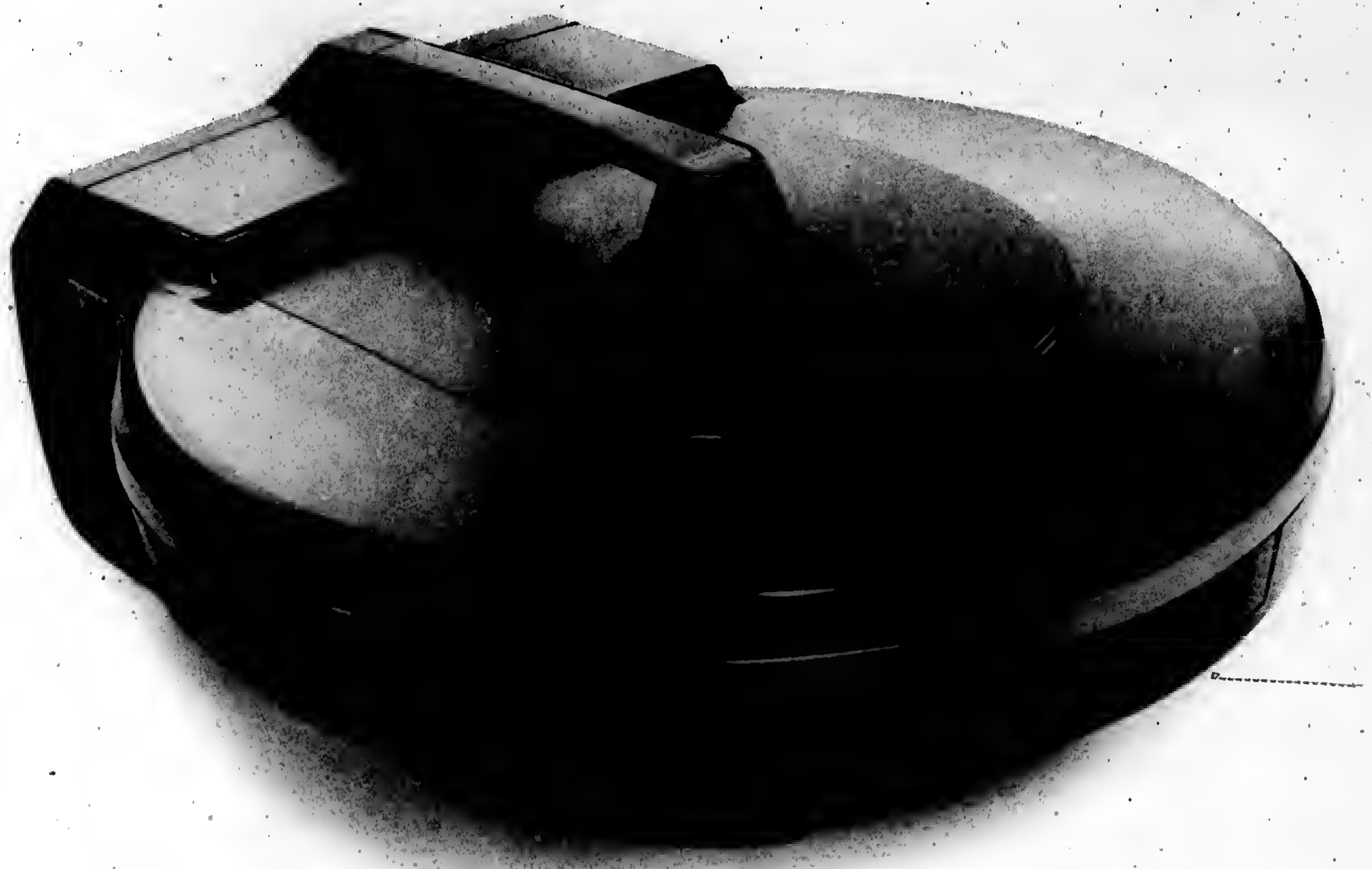

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Burroughs Unwraps Two B80 Models

By Esther Surden
CW Staff

DETROIT — Burroughs Corp. has added two models to its B80 small business system line and at the same time increased—the amount of memory available on the line's original model.

The two models announced were the B80-20 and the B80-60; the original model, introduced April 1976, has become the B80-30.

All B80 models now have a minimum of 60K of memory, a spokesman noted. Memory can be expanded from the basic 60K to 124K in 16K-byte increments, he added.

The B80-20 occupies 54% less floor space than the original B80. This entry level unit can accommodate up to eight I/O channels; users can choose either a 60-or 180 char./sec built-in line printer, a free standing 160- or 250 line/min printer and up to two data communications channels for the system, Burroughs said.

Mass storage for the unit can be the firm's double-sided floppy disk subsystem, which can handle up to 4M bytes; a removable disk cartridge subsystem with a 18.4M-byte capacity; or a fixed-disk subsystem holding up to 18.8M bytes.

The B80-60 is a larger version of the B80 that can accommodate more disk storage and greater I/O than the B80-20. Users can store up to 6M bytes of data on the super minidisk, 27.6M bytes in disk cartridge subsystems and 37.6M bytes of fixed disk.

Eight I/O channels are standard on the B80-60, but these are expandable to 11 channels. Up to four data communications channels can be added to this model, the company said.

Burroughs' B80-20 system occupies less floor space than earlier models as a result of using 4K chips, according to the firm.

A basic B80-20 with 60K bytes of memory, a 60 char./sec printer, 2M bytes of floppy disk, a CRT and keyboard costs $18,510 and leases for $617/mo.

A similarly configured B80-30 with 60M bytes costs about $22,000.

The B80-60 with 37.6M bytes of fixed disk and two TD 830 workstations costs $59,400; it leases for $1,650/mo on a one year-lease, Burroughs said from its headquarters in Detroit, Mich. 48232.

DG Adds Interfaces, Software to Micronova

WESTBORO, Mass. — Data General Corp. has announced several enhancements for its Micronova systems.

Among the enhancements are I/O interfaces and software upgrades designed to make the system simpler to use in process control, commercial, instrumentation and communications applications, according to the firm.

To make the system suitable to process control and instrumentation applications, DG introduced digital I/O, digital-to-analog and analog-to-digital interface boards.

For more complex operations, the firm introduced a DG/DAC interface board that connects the Micronova I/O bus to the firm's DG/DAC Sensor I/O subsystem chassis which interfaces the system to sensors or associated electric circuits. The DG/DAC costs $2,200.

The Model 4222 digital I/O interface occupies a single Micronova board and plugs directly into the system's chassis to provide stand-alone data acquisition capability, the firm said. It costs $400.

Some peripheral controllers were also introduced. Fast I/O devices can interface to the Micronova using a direct memory access technique controlled by the 4229 High-Speed Data Channel Interface, DG said. This device, priced at $700, disables the Micronova clocks, disconnects control and data signals form the memory bus and then handles all data transfer control and memory refresh, a spokesman said. Typical throughput is 830K word/sec, DG said.

Reader Interface

A paper-tape reader interface, introduced with this announcement, controls DG 6013 400 char./sec 8-channel paper tape readers. A Nova compatible real-time clock resides on the board. An alternative model of this interface allows users to select either the interface's clock or the Micronova's clock during system generation, the firm said.

The paper-tape reader interface alone costs $400; the clock costs $350 and together on the board they cost $700.

Another interface allows the system to be linked to DG line printers. This costs $650.

(Continued on Page 57)

Mini Speeds Analyses Of Agricultural Data

By Ann Dooley
CW Staff

BELLE GLADE, Fla. — A minicomputer at the University of Florida's Agricultural Research and Education Center is saving time and money for plant and animal researchers here.

The Wang 2200 system has helped free scientists to perform critical agricultural research, according to associate professor G.J. Gascho.

But others at the center have not always agreed wholeheartedly with Gascho.

The system is not sophisticated enough and the problems caused by that are almost "insurmountable," according to Chris Richardson, former programmer at the center.

Although Richardson believed the center needed a new system, Gascho said the system is perfectly adequate for the center's work. It can't handle extremely sophisticated jobs, but that's not its purpose, he said.

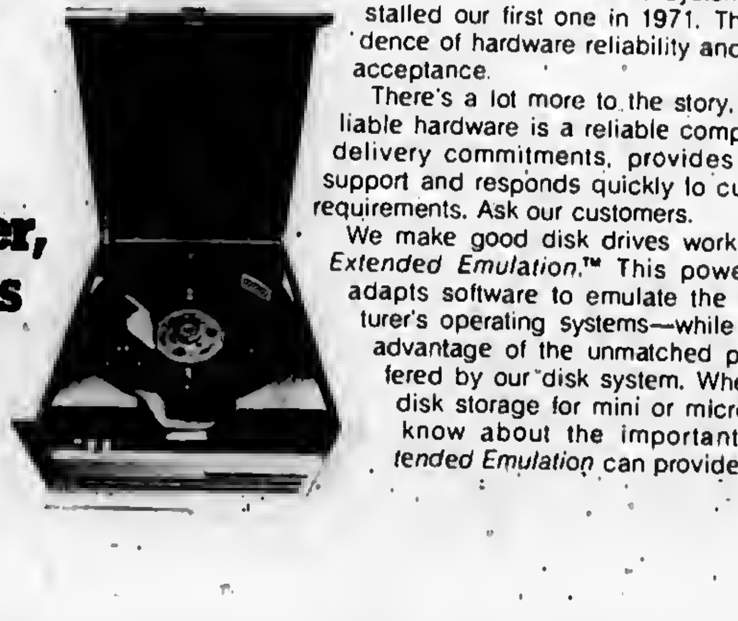
The system was originally purchased for statistical analysis of research data collected by about 20 engineers and plant and animal scientists, according to Gascho.

Now, in addition, "scientists with little or no training in computer programming can develop their own specific programs with the help of the few who have some experience with programming," he said.

The center's system is three years old and includes a single cassette tape drive, a matrix printer, 12K memory, a keyboard, a Wang 2200B and Teletype communication to an Amdahl system at the Southeast Regional Data Processing Center in Gainesville.

In addition to the statistical analysis, the center also uses the

(Continued on Page 57)



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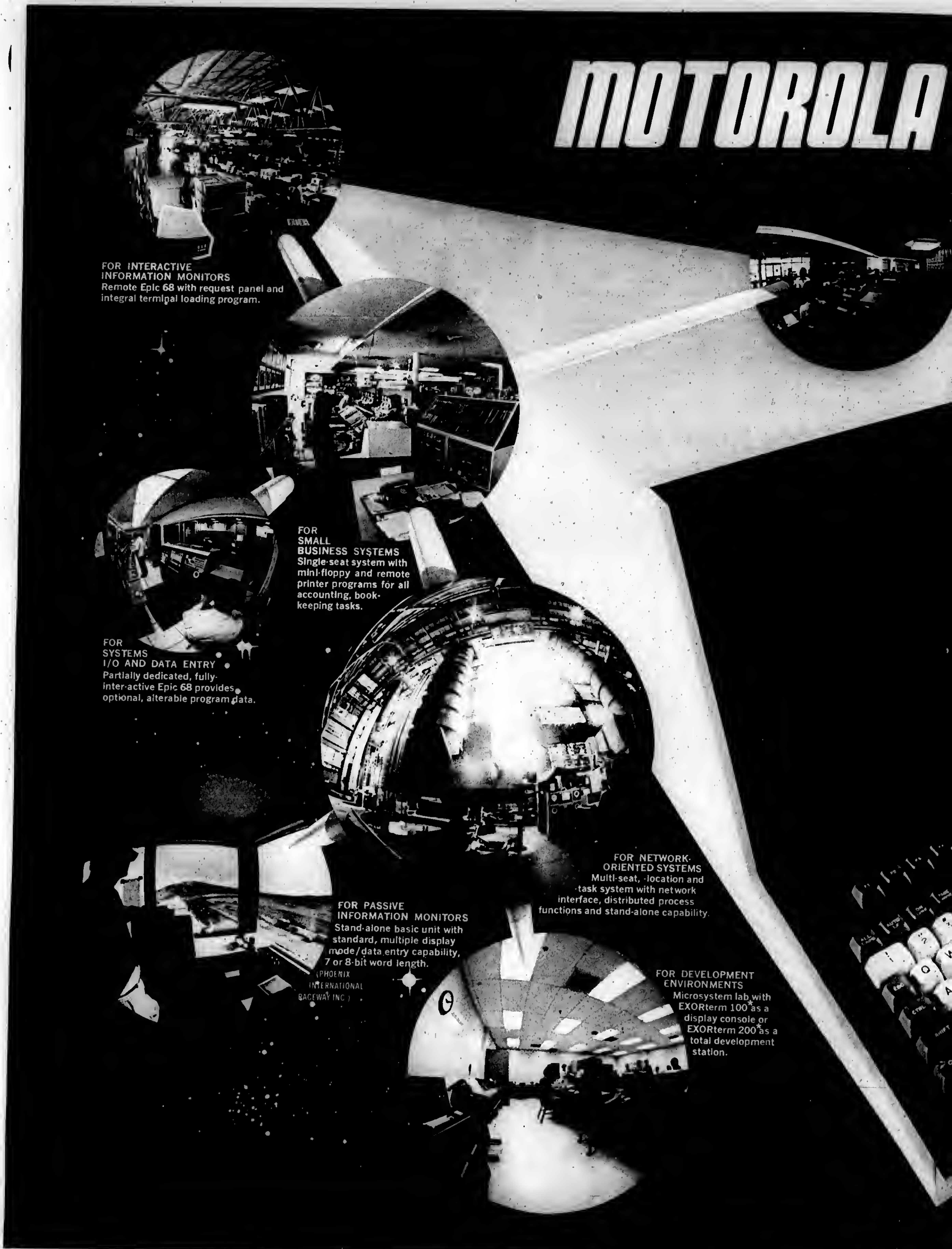

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Printer for S/3

STAMFORD, Conn. — Digital Associates Corp. (DAC) is offering a 750 line/min printer for the IBM System 3.

The heavy-duty 132-column line printer, which uses the Chaintrain printing technique, includes as standard a sound-deadening cabinet, static eliminator, paper puller, single-line memory buffer and Ebcdic 48-character lower case set and coding, DAC said.

The DAC/3-750 operates under the standard system/3 supervisor and normal I/O support routines, a spokesman said.

Tagged at $15,854, the printer is available from DAC at 1039 E. Main St., Stamford, Conn. 06902.

Turnkey Works for Insurance Agents

EVERETT, Mass. — Minicomputer Systems Technology, Inc.'s (MST) Abacus system is an in-house minicomputer system for insurance agents and brokers.

The system allows the cost-effective management of an agency and also provides sales information to help market agency products, the vendor claimed.

The system contains several independent modules including premium billing and policy maintenance; accounts receivable; company accounting and reconciliation; broker and producer accounting; accounts payable; general ledger; and management reports.

Self-Instruct Manner

Abacus includes more than 140 programs and is written in a tutorial, self-instruct manner that allows the nontechnical user to pick the job or function to be done from lists displayed on the CRT screen, MST said.

This conversational operating mode allows the system to be run in a programmerless environment, a spokesman added.

Provides Billing

Since the disk files in the system hold a data base of customer and policy information for a 12-month period, Abacus provides billing, renewals and expirations based on historical policy data.

Abacus is installed as a turnkey system with 32K bytes of memory and one to 32 CRT screens. Disk size ranges from 500K bytes to 88M bytes. The system will support one or more printers.

A single-user system costs $27,900 or leases for $625/mo.

MST is at 137 Ferry St., Everett, Mass. 02149.

Add-On Offered For DG Memory

SANTA ANA, Calif. — Standard Memories/Trendata has introduced an add-on core memory designed for the Data General Corp. Nova 3/4 and 3/12 minicomputers.

The Pincomm N3 is a plug-in mainframe memory system with storage capacity of 16K words by 16 bits. Up to eight of the Pincomm N3 modules can be configured to give the Nova 3/12 a maximum capacity of 128K words, the vendor said.

Memory access and full cycle times are 350 nsec and 1 microsec maximum, a spokesman said. Pincomm N3 has three operating modes: read/restore; clear/write; and read/modify/write.

The memory has been field-tested and "proven to meet or exceed the operating parameters required when inserted in any memory allocated connector position in all CPU models," the vendor claimed.

The Pincomm N3 costs $1,808.

Standard Memories/Trendata is at 3400 W. Segerstrom Ave., Santa Ana, Calif., 92404.

Lexidata Adds Soft Mini Plotter

BURLINGTON, Mass.— A full refresh, raster scan video soft plotter that reportedly fits any minicomputer and runs on standard hard-copy plotter software is available from Lexidata Corp. here.

The Lexidata Universal Soft Plotter is self-contained on a single printed circuit board and can be connected to any minicomputer via that system's standard hard-copy plotter interface, a spokesman said. Any standard hard-copy plotter applications and driver software will run the soft plotter at speeds in excess of 6,000 point/sec.

This speed makes the Universal Soft Plotter suitable for previewing slow, complicated plots, or for running many different plots, the company added.

For resolution of 256 by 256, the unit costs $1,900; for resolution of 512 by 512 it costs $2,900. A black-and-white viewing monitor costs an additional $250. Lexidata Corp. is at 215 Middlesex Tnpke., Burlington, Mass. 01803.

Printcraft Guide Lists Compatible Media

NEW YORK — Printcraft Systems, Inc. has published a four-page cross-referenced guide of compatible magnetic media supplies used with minicomputers and word processing systems.

The reference lists compatible diskettes, cassettes, magnetic cards and tapes, data cartridges and disk packs for any system manufactured, a spokesman said.

Printcraft is at 11-17 Beach St. N.Y., N.Y. 10013.

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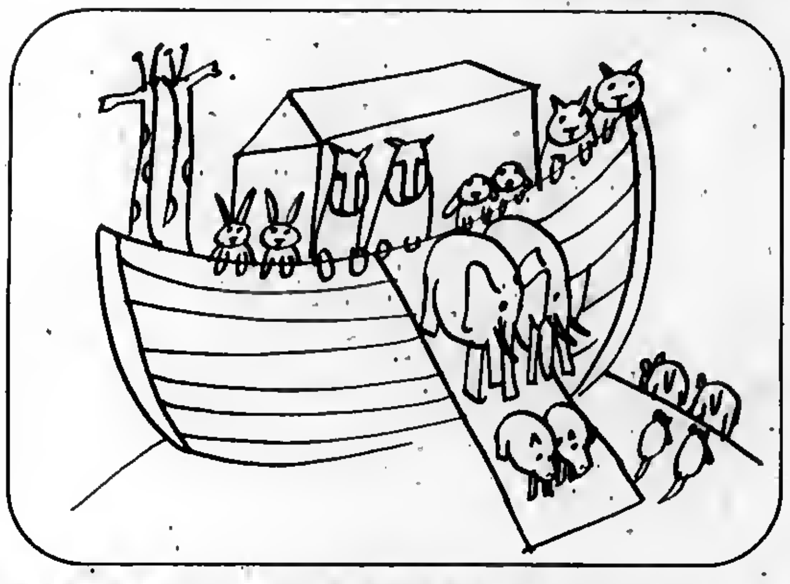

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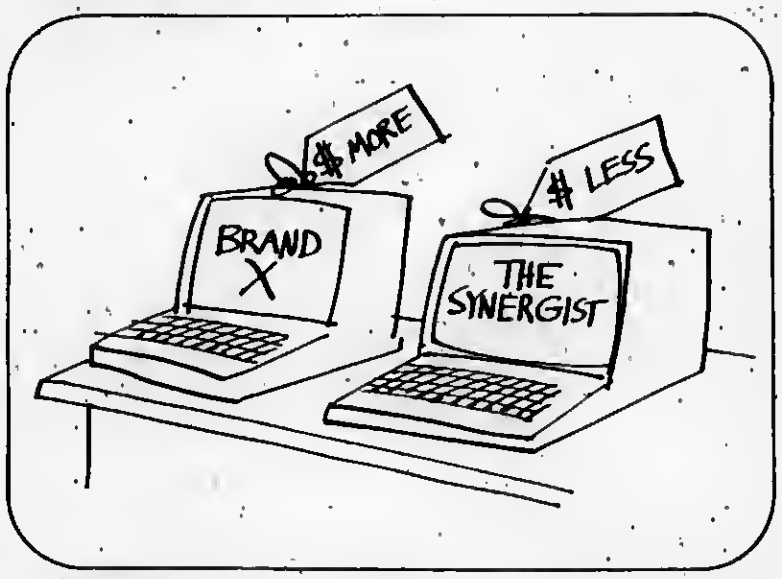

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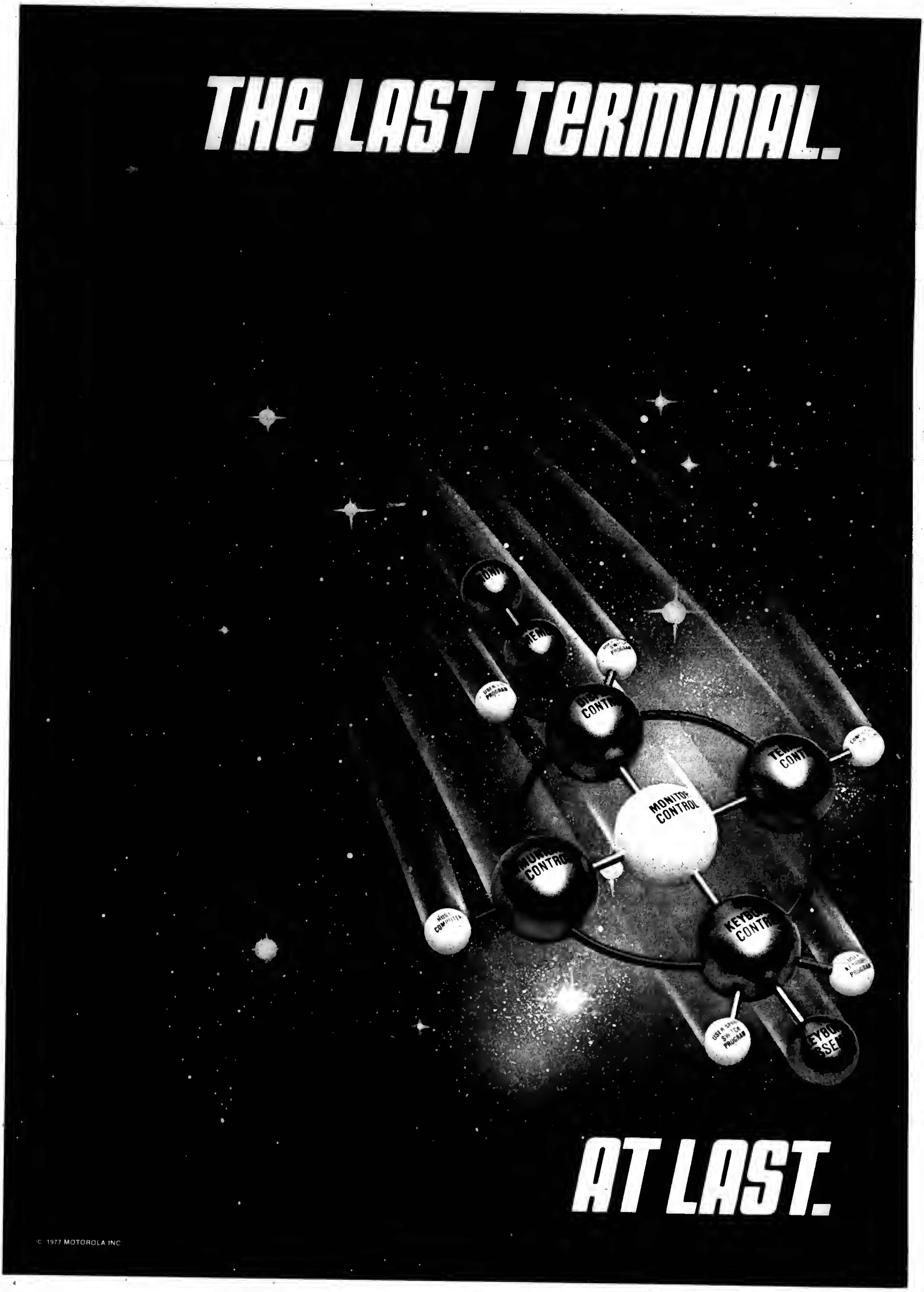
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For Daily Doughnut Deliveries

Baker's System Freshens Billing, Distribution

TAMPA, Fla. — A small business system at a Krispy Kreme Doughnut Co. franchise here has helped the firm take a fresh approach to its routing, distribution and billing applications.

The company, a wholesale/-retail producer of doughnuts with its wholesale operations representing 70% of the business, sells to thousands of customers ranging from large supermarket chains to small "mom and pop" stores.

Since the firm offers a "guaranteed sale," careful control of distribution is important; any unsold day-old doughnut is returned for full credit, according to Robert L. McCoy, executive vice-president of the franchise. "Wholesaling of a fresh dough product on a daily basis makes us unique. If it isn't sold, our delivery man picks it up and replaces it with a fresh product".

The system has made a significant difference to the business, he said. "Everything about our business changed" after the firm switched from a manual system to a computer-controlled environment.

"The route salesmen needed the most adjustment. They were each doing their own thing. For example, they knew what was sold and to whom. We didn't. We didn't even know how many accounts we had! Cash accounts were handled in an unprofessional manner when it came to documentation. Also, we provided trucks and gas but didn't know if they were traveling 15 miles to sell a dozen doughnuts.

"Now we know every customer and where— every doughnut goes. And we know how many returns we get," he said. "Having the knowledge to eliminate the accounts that were not profitable and sell more to those who were selling out every day helped justify the use of the system," McCoy added.

Full-Shelf Stategy

Marketing information also indicated that full shelves sell more doughnuts, because no one likes to take the last package for fear they are stale. Therefore, a certain amount of returns are built into delivery to increase total marketing gross, he explained.

Although the company was aware of the "full shelves" technique, before installing the system it had no way of determining how many doughnuts to place in a particular selling situation for a maxiumum advantage with a minimum of returns, he noted.

A weekly printout now itemizes the sales of each route salesman, detailing the store and the amount returned.

McCoy had had exposure to DP techniques in college. He suggested to his father, B.L. McCoy Jr., president of the company that computer programming and techniques might increase billing capability and provide feedback while giving a marketing forecast — all impractical under the hand-tabulated employee acounting system.

"At first I thought the computer's advantages were a little fanciful, but I was willing to let the computer people and Bob show me if it would be practical," his father said.

The McCoys' first exposure to a computer salesman was somewhat disturbing. After they had defined their problems, the initial reaction of the representative was to offer a unit that solved the immediate problem, then sell additional services that would require a move to a larger system. This usually resulted in a final proposal that "blew our mind."

A Cincinnati Milacron distributer contacted the firm and proposed a system based on a CIP 2200. The system was capable of solving the company's immediate problems, as well as coping with additional applications later.

Before choosing the system, the doughnut makers looked at several manufacturers' minis including Digital Equipment Corp., NCR, Honeywell Information Systems, Qantel Corp. and IBM.

Tailored Program

Bob's father commented on the ability of the representative to tailor a program to their needs. "Anyone who buys a new computer accepts that there will be problems. The representative lived up to every commitment and seemed as interested in our business as we were."

The younger McCoy commented. "Sure, at first we had some software problems. But I could see the distributor on Sunday night at 3 a.m., if I needed to, in those first days. Its cooperation was outstanding."

The software configuration allows operation in accounts receivable, billing and route sales analysis. All of the production (for example, standing orders) can be coded to the day. "We know how many doughnuts to make for every shift at both plants. The system also automatically prints invoices for every account on a daily basis. The invoice goes out with the doughnuts, is signed, returned, and fed back into the computer to update accounts receivable and provide a sales analysis," the younger McCoy explained.

Billing used to be a nightmare before the system was implemented. Variables included weekly, biweekly, monthly and special arrangement accounts (cash customers and charge customers). "With the volume of accounts and the variety of account procedures it became quite a chore, almost impossible," he said.

Salesmen Handle Receivables

Also, the route salesmen were responsible for cash sales. The system made it possible for the salesmen/route delivery men to handle receivables. Now management receives cash invoices and gets a sales analysis on short notice.

Sales information fed into the system gives a breakdown on what each particular store is selling. This allows the McCoys to "forecast in regard to product and what kind of returns we'll be getting. The computer has enabled us to increase the capacity to handle invoices (about 1,000 per day). Quite frequently, it was difficult to get our statements out on time and we needed extra manpower. On many occasions we ran late."

DG Eclipse Unlimited Memory?

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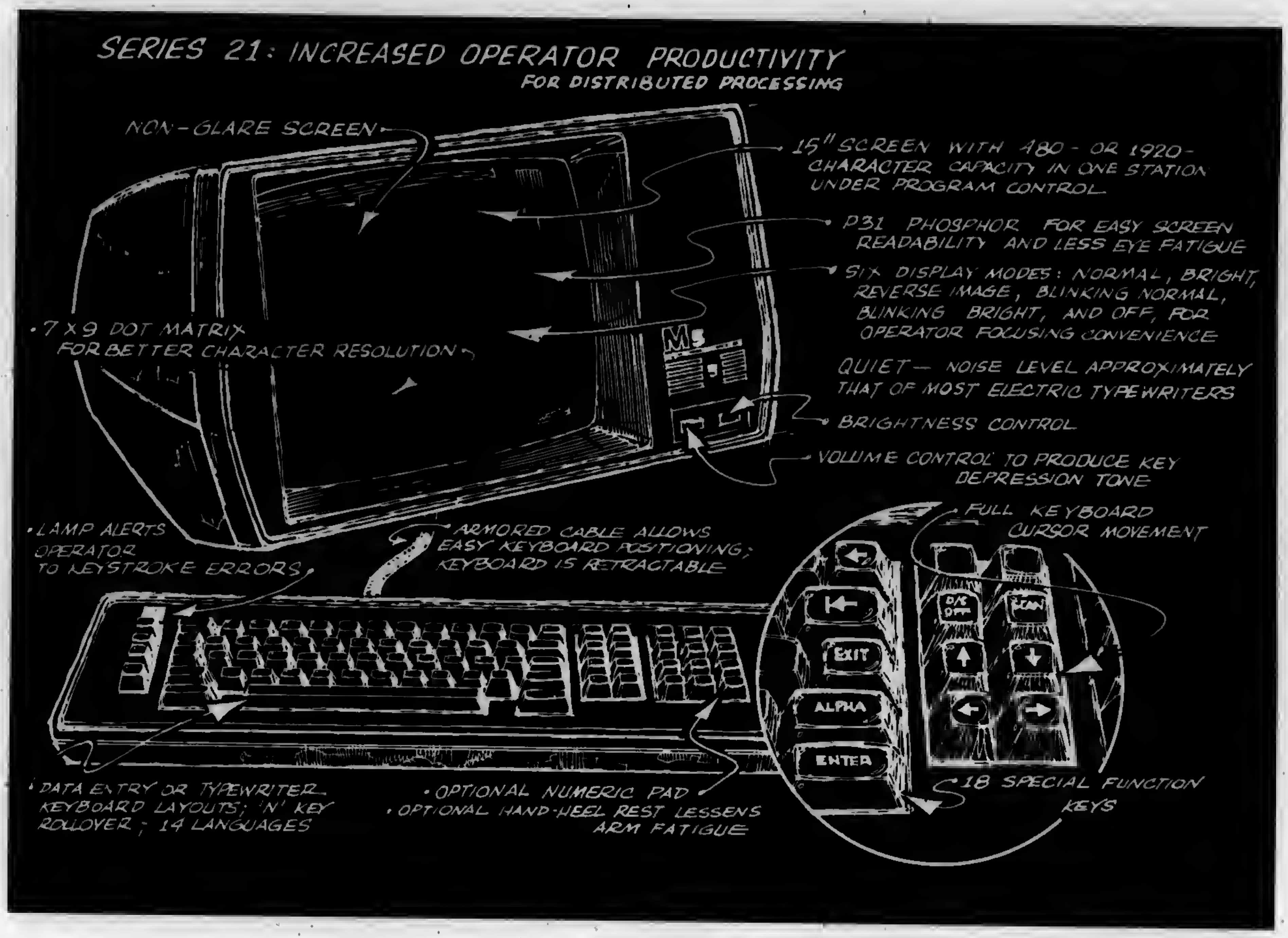
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Mini Gives Insurance Agents More Confidence

By a CW Staff Writer

LOS ANGELES — Faced with only moderate sales and an inexperienced staff, an insurance agency here managed to boost sales 60% in five years from $11 million to $17 million with help from a minicomputer system:

When Charles Vance became head of one of Pacific Mutual's Los Angeles agencies, seven of his top agents were planning to retire or leave the company. New agents would need extensive training as well as years of experience before they could produce at top level.

In order to keep sales from dropping any lower, Vance began a study to determine how to maintain and increase the agency's sales. He found his answer, he said, with a Wang Laboratories, Inc. WCS-20 system and Wang's Lifeline software, which is used as an in-house policy illustration and letter-writing system.

Quick Illustrations

Computerized policy illustrations are one of an insurance company's most effective tools, according to Vance. Before the Wang system was implemented, however, younger agents were reluctant to use them; time-sharing companies charged up to $8 for each illustration and the agents couldn't afford them, Vance explained.

In addition, the time-sharing services didn't allow any flexibility in designing and modifying the illustrations at a reasonable price, Vance said.

In order to find a substitute for time-sharing, Vance and Craig Freeman of Software Systems, Inc., a member of Wang's National Software Vendor Network, developed what has evolved into Lifeline.

With a few input variables such as policy values, age of prospect, dividend and rider options, Vance and his agents can now produce within minutes any illustration necessary for an effective sales call, he said.

The system provides policy illustrations for ledger statements, three-term insurance schedules, flip-flop proposals and schedules for flexible deposit and split-dollar policies.

The system also automatically compares various policies, including those of competitive carriers, in terms of value, premium outlay and investment return.

The capability of producing limitless illustrations without a charge for each one has encouraged Vance's agents to prepare a variety of proposals to find the best alternative for each customer, he noted.

The system has given new agents confidence in dealing in a sophisticated marketplace and has provided the more experienced agents with increased time to devote to selling instead of working out the complicated proposals, Vance said.

Letter-Writing Program

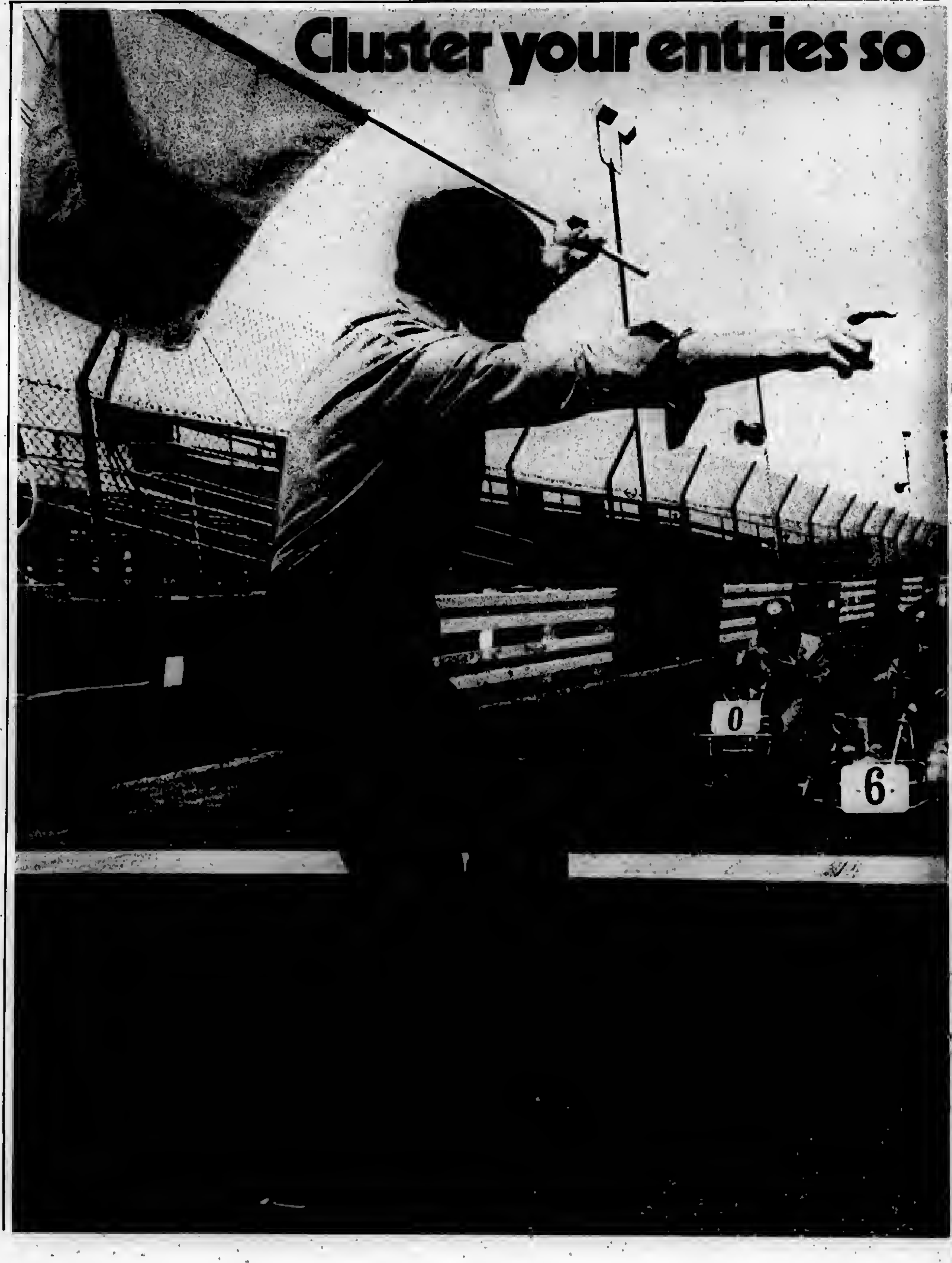
"In five or 10 minutes, we can do what it would take a person five or 10 days to do with a calculator and a pencil," he added.

In addition to the illustrations, the system features a letter-writing, editing and mailing list management program that is used to generate new sales leads, stimulate sales from current policyholders and even recruit new agents, according to Vance.

The interactive Lifeline couples an automatic user-maintained client file with custom-designed letters and memos, stored on floppy diskettes, to deliver personalized mailings, Vance said.

Lifeline extracts names from the file based on any parameters the user selects then automatically inserts the selected information into a prewritten letter.

The Pacific Mutual agency uses Lifeline on Wang's Model 2281W daisy wheel high-speed printer. Vance originally installed a cassette-based Wang system, but later upgraded to a WCS-20 with 16K CPU and Model 2270-2 floppy diskette for faster response time.



Mini Helps Researchers Sort Agricultural Data

(Continued from Page 49)

computer system for simulating and calculating celery growth models.

The center uses Statistical Analysis System (SAS) software from SAS Institute, Inc. for sugar cane growth and nutrient analysis, Gascho said.

Soil Evaluation

In addition, the system is used for making yearly fertilizer recommendations for sugar cane growers in the surrounding area.

Using the computer, a technician can type the grower, lab, field identification and soil test values directly on the system keyboard. The data can then be typed and appropriate copies made for the grower, the extension agent, the fertilizer dealer and for the center's file. The extension agent can then check for any abnormalities in the soil in a much shorter length of time and with less errors than through using the previous manual method, Gascho stated.

Payroll for the center's employees is also handled on the system, he added.

Some of the data and more complicated statistical procedures require more memory than the Wang system has. For this data, the system can be used to access the Gainesville computer, Gascho said. "Prior to our having this capability, one to six months were often required for obtaining statistical results. With the present system, these results are obtainable in one day," he said.

So the system actually provides in-house processing with extended capabilities obtained through time-sharing, he said.

Wang's service to the center has been good, especially considering that it is 50 miles away from the nearest local service, Gascho said.

Purchase of System

The system was purchased over time because the $20,000 purchase price was too high for any one year's budget, Gascho said. The first upgrade included CRT, keyboard and memory enhancement. A high-speed printer and terminal accessories have also been purchased over the least three years, he said.

Although the demands put on the system have increased, Gascho feels it is better to upgrade than buy a completely new system.

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Bell System

DG Updates Micronova

(Continued from Page 49)

A paper-tape software package was also introduced. The software includes an editor, assembler, debugger and Basic, each designed to operate in 4K of memory, the company reported. The first-time license fee for this package is $125.

In addition, a programmable read-only memory burner utility program was announced. This free package operates under DOS and RTOS. DG is at Rt. 9, Westboro, Mass. 01581.

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Monitor System Keeps Things Rolling at Mill

PROVO, Utah — A mini-computer-based automatic maintenance monitoring system is helping prevent unscheduled downtime and reduce scrap loses at a Geneva Works of U.S. Steel mill here.

The monitoring system is also used to help prevent breakdowns in the water recycling system and to distribute the plant's natural gas allocation over its 24-hour period, a spokesman said.

Geneva Works is a fully integrated steel mill in which iron ore, coal, limestone and scrap are processed through various stages into semi-finished and finished products.

Before mini-based monitoring, rolling mill bearing temperatures, oil flow rates and oil pressures were checked visually by operators in the mill.

The method was costly and it was not foolproof in preventing unscheduled maintenance. Operators could make errors, and the more points any operator watched, the less likely he was to catch a problem before it caused an unscheduled shutdown.

More than four years ago, it was suggested that automated maintenance monitoring could save the plant money by spotting problems before they developed.

If the system could, for instance, spot a temperature rising in a bearing, it might be possible to "coax" the bearing to continue working until a scheduled maintenance period. Or at least it would be possible to clear the mill so that the product in process would not have to be scrapped.

The system selected was the Hewlett-Packard Co. 9600 with Real-Time Executive II operating system and an HP 7901 disk drive.

The system takes care of the real-time task of maintenance monitoring, as well as on-line program development, program testing and editing, disk storage of programs and data and program linking. The program language adopted was Fortran.

The system currently monitors the temperatures of 42 bearings ranging in diameter from 4- to 14 in. in the motor room of the slab rolling mill. It also monitors oil flow rates and oil pressures to those bearings. Most of the tasks are confined to a motor room 300 feet long by 80 feet wide.

The system is programmed to scan each bearing temperature once every minute. If a temperature reaches 178° F, the mini sounds an audible alarm in the Load Dispatch Center and simultaneously prints the number of the problem bearing, its temperature and the time of scan on a CRT terminal in the center.

The load dispatcher then calls a maintenance operator by telephone and instructs him on what action to take.

The load dispatcher can request a scan of the bearing as often as he wishes and can get a hard-copy printout by bearing, number and time from the computer.

August Develops Data Handler For Desktop CPU

ORANGE, Calif. — August Technology Corp. has an intelligent data handling and recording device designed for use with Hewlett-Packard Co., Wang Laboratories, Inc. and IBM desk top systems.

The 7701 provides multiple I/O channels, data manipulation capabilities and storage of up to 580K bytes per cassette; it includes an 8080-type microcomputer and up to 64K words of memory, according to a spokesman.

The unit contains up to 10 teletypewriter current-loop, synchronous or asynchronous RS-232 ports and an 8-bit parallel data bus, the spokesman said.

Data can be recorded and played back on a Philips-type cassette through any port on the bus at the same or different rates, and data can be transferred among ports and the bus without recording, the company claimed.

The basic system with 2K of random-access memory and a 1K buffer costs $3,250. Prices range to $5,000 depending on the number of ports, interface, amount of memory and options, the spokesman noted from the firm at 2040 N. Maplewood St., Orange, Calif. 92665.

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Has Job Many Would Envy

DP Manager Amasses Treasure Trove

By Jeffry Beeler
CW Staff

LOS ANGELES — Many die-hard microcomputing enthusiasts would probably like to trade places with William C. Hoffer. Like the proverbial child turned loose in a candy store, Hoffer, who serves as DP manager for one of the organizations in a large aerospace firm, roams the hobby computer market almost at will and samples its vast and varied delights at every opportunity.

If a particular piece of hardware strikes his fancy, as often happens, he nonchalantly buys it with company funds and takes it back to his home or office, where he experiments with the new acquisition at his leisure.

As a result of his sampling and impulse buying, Hoffer has amassed a small fortune in microcomputing hardware. His collection at work alone includes a 48K-byte Imsai 8080 microprocessor unit (MPU) with an 8K programmable read-only memory, an Imsai FDC 2-2 dual floppy disk unit, a Digital Equipment Corp. LA36 Decwriter terminal and a small trove of boards, including a Technical Design Labs (TDL) MPU built around a Zilog Z-80 microprocessor, Industrial Micro Systems and TDL memory boards, D.C. Hayes 103 modem boards, Compu/Time date and time boards, Imsai 2-2 serial input/output boards, and TDL monitoring boards.

What's more, the DP manager has assembled an almost identical hardware array at his home.

Evaluation the Impetus

Hoffer's yen for hardware collecting, however, is prompted by more than just a "pack rat" instinct or the hobbyist's love of tinkering. His main reason for assembling such a large assortment of microcomputer equipment is to evaluate each new hobby computer offering as it enters the market and determine to what extent these products could blend into his company's existing engineering environment.

Hoffer's firm, which designs and builds guided missiles for the U.S. Department of Defense, currently uses an "awe-striking" array of computer systems for its engineering applications, he said. These systems include an Amdahl Corp. 470, "many" IBM 370/168s and Hewlett-Packard Co. 3000s, Decsystem-10s and a variety of other IBM mainframes.

The company also farms out some of its design work to various service bureaus, he added.

After a year of experimenting with and evaluating various microcomputer systems, Hoffer has concluded that some of the equipment he has collected could well find a place in his company's guided missile design projects, especially in routine "number-crunching" applications.

In fact, he will eventually submit four of his microcomputer systems to the company's missile designers for consideration as possible engineering tools. Hoffer hopes to make his equipment selections by the first quarter of next year.

Potential Cost Savings

The chief benefit of using microcomputer systems to aid design work lies in their potential cost savings, the DP manager explained. Hoffer bought his office system a year ago for only about $5,000 to $6,000; the equipment costs almost nothing to operate, he said.

With the large computer systems and the service bureaus, in contrast, Hoffer's company "spends many times that amount each month" just for service charges and other operating expenses, he said.

The benefits of having a home microcomputer system, on the other hand, have been more difficult to identify. Hoffer admitted that in the year or so since he acquired the personal computer system, he has found "very few" applications for the equipment.

"I have aspirations of doing all those wonderful applications that magazine articles say you can do with a microcomputer system," he confessed. To date, however, lack of adequate software has prevented him from achieving most of his applications goals for the home system, he noted.

Both the home and office systems accommodate programs written in Assembly language, two versions of Fortran and three versions of Basic. Hoffer uses the Assembly language programs to drive his peripherals and the remaining programs for all other functions.

The office system runs under a Digital Research Corp. CP/M operating system; the home system, under a TDL Zapple operating system.

For the most part, Hoffer is satisfied with the performance of both systems. "On a scale of one to 10, I'd rate the systems at least a nine," he said.

Although hardware documentation has proven poor, software documentation usually has been good and at times "outstanding," he stated.

The only serious problem Hoffer encountered occurred shoftly after he installed the systems, when he "plugged the equipment in and nothing happened," he recalled. The office system took about six weeks to "debug" and make fully operational and the home system took about a week, he added.

Professionalism Still to Come

Hoffer attributed his early problems with the two systems to lack of adequate hardware testing by hobby system retailers and to a paucity of professionalism in the microcomputer industry as a whole. "It will be another couple of years at least before the industry matures to the point where it's fully professional," he believes.

At present, he said, the industry is populated largely by "entrepreneurs who know a great deal about hardware, very little about software and almost nothing about business."

To achieve the professionalism it needs, the microcomputer industry must, among other things, adopt strict interfacing and other hardware standards similar to those that have prevailed in the large systems sector of the computer industry for years, Hoffer advised.

Micro Becomes Teaching Tool In Auditors' Basic DP Course

By Tim Scannell
CW Staff

CINCINNATI — A supervisory mathematician here supplements a training program in basic DP for auditors with an Imsai 8080 microcomputer, which he uses to provide both graphic instruction and "hands-on" experience.

Arthur Foreman, an employee of the U.S. General Accounting Office (GAO), uses the microcomputer, assembled from a kit, to show his pupils the basic simplicity of a computer's operations, he said.

The MPU that is currently installed uses machine language and contains 4K of read-only memory (ROM).

Foreman decided to use the 8080 for his teaching because it proved to be more practical than using a large mainframe with a class that knew relatively nothing about DP, he said. "I try to show the other auditors what a computer is, what it does ... and go from there so that they understand some of the basic controls involved." Using the Imsai, "I can demonstrate how primitive a computer is, which is something you can't do with a large system," he explained.

Homework First

He decided upon the Imsai 8080 after reading about the various models and system in trade magazines and newsletters and comparing their specifications with his needs. He also consulted a friend who had an Altair microcomputer, which he had assembled.

After comparing the Imsai circuitry with that of his friend's computer, he decided to purchase the 8080. "I got the circuit diagrams, and certain things just didn't look as good as the Imsai. Imsai [at that time] was using standard chips [Intel], whereas the first Altairs weren't," he said.

Foreman purchased the Imsai from a firm called Cheap, Inc. "... because the name sounded great" and because they were offering a 20% discount.

"Building the kit was more or less like doing needlepoint," Foreman explained. "There was the mother board that contained 22 slots and 100 wires, which is 2,200 soldering connections. So you don't learn too much about electronics but you do learn a great deal about soldering." Total time spent assembling the kit was approximately eight weekends, he added.

The only problem he had with the computer was the discovery of a bad chip when he had finished the assembly. Although he could pinpoint where it was, he felt he wasn't technically capable of debugging the MPU, so he had to send the unit back to Imsai for repairs.

Month to Repair

"It struck me that microcomputers just weren't for the commercial world. Even though [Imsai] was nice about it, it took a month to six weeks to repair the unit. That would have been disastrous if I were really depending on it."

Foreman is currently experimenting with building an interface board for the microcomputer and hopes to connect it to a series of lights, bells and buzzers to further demonstrate its capabilities to his students. He also eventually hopes to purchase a used Teletype or CRT monitor to further supplement the Imsai system.

Although Foreman is associated with the auditing department of the GAO, he doesn't use the microcomputer in any of his auditing duties. The department uses an IBM 360/168 in all of its auditing functions, he said.

The 8080 is used for approximately two hours a week in the training classes at the GAO. "It is my hope that other people in the office have been given some sort of feeling about what goes on in a computer. Rather than saving time [in the classroom], it promotes a deeper understanding of what a computer does," Foreman said.

C

CCD (CHARGE-COUPLED DEVICE) — Image sensors known as CCD are nickel-sized or smaller silicon chips, some containing over 120,000 electronic elements. When an image is focused on the CCD, the sensor's electronic elements transform the picture into individual electric charge packets. These packets are then read out very rapidly by charge transfer techniques. The resulting information then can be processed and displayed as a TV picture. In the CCD, half the electronic elements form the imaging array and the other half are for storage and readout.

CELL — 1. The storage for one unit of information, usually one character or one word. 2. A location specified by whole or part of the address and possessed of the faculty of store. Specific terms such as column, field, location and block are preferable when appropriate.

CHANNEL — 1. That portion of a computer's storage medium which is also accessible to a given reading station. 2. That part of a communication system that connects the message source with the message sink. In the information theory in the sense of shannon the channel can be characterized by the set of conditional probabilities of occurrence of all the messages possible received at the message sink when a given message emanates from the message source. 3. A path along which signals can be sent, e.g., a data channel, output channel. 4. The portion of a storage medium that is accessible to a given reading or writing station, e.g., track, band. 5. In communication, a means of transmission. Several channels may share common equipment. For example, in frequency mulitplexing carrier systems, each channel uses a particular frequency band that is reserved for it.

CHARACTER — One of a set of elements which may be arranged in ordered groups to express information. Each character has two forms: 1. a man-intelligible form, the graphic, including the decimal digits 0-9, and letters A-Z, punctuation marks and other formatting and control symbols; and 2. its computer-intelligible form, the code, consisting of a group of binary bits.

CENTRAL PROCESSING UNIT (CPU) — 1. A unit of a computer that includes the circuits controlling the interpretation and execution of instructions. Synonymous with mainframe. Abbreviated CPU. 2. The central processor of a computer system contains main storage, arithmetic unit, control registers and scratchpad memory.

LEARNER'S LEXICON

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Manufacturers' Ideas Guard Against Static

Special to Computerworld

Minicomputers, microcomputers, hand-held calculators and many terminals would not be possible without MOS microcircuits. These bits of silicon perform the functions of entire assemblies, but cost much less. Every technological advancement, however, has a price in terms of requiring changes in procedures and equipment. The price for obtaining the advantages of microcircuits is that they are sensitive to a common phenomenon — static electricity.

Anyone handling an MOS device or a subassembly containing one must learn a whole new set of rules.

Static electricity can be generated by many sources — carpets, clothing, motors and friction. Static electricity can even occur when any two materials make contact.

Some combinations of materials generate considerable more static electricity than others. There is a transfer of electrons, with one material coming away with negative charges and the other with positive charges.

Static electricity is dissipated, and a spark can even occur when this phenomenon (known as the triboelectric effect) takes place.

Therefore, if a microcircuit is placed on a surface of another material — a plastic shipping box, for example — it would be a party to creating its own source of harmful static electricity.

The most threatening source of static electricity, however, is any person who contacts it. An electrostatic charge of less than 100 volts can "blow out" the thin layer of glass that insulates the microcircuit gate from the substrate. A human body can generate as many as 50,000 volts.

MOS devices manufacturers through the years have developed techniques and equipment for protecting MOS devices while they are being produced and shipped. This technology is passed along to companies that install the microcircuit devices in their computer products. Printed instructions accompany the microcircuit shipment.

If damage persists, a quality control engineer may visit the plant to recommend changes in the way the microcircuits are handled. Unfortunately, this data is not passed on to the hobbyist who is assembling his own computer system.

While microcircuit manufacturers have differing procedures for protection against electrostatic damage during production, they generally agree on fundamental techniques, materials and equipment recommended for anyone who later must handle microcircuit devices. The procedures are easy to follow.

Makers' Recommendations

Some guidance can be gained by looking at a basic conductive "workstation" that contains the basic items recommended by manufacturers for use in handling microcircuits. These are:

- A conductive plastic wrist strap having a Velcro fastener to hold snugly but comfortably around the wrist and a clip on the other end to attach to a ground. This drains static electricity at the closest point to the work that is possible without interference with finger movement..
- A conductive plastic workbench cover to spread out before putting the microcircuit product down. A microcircuit should never be placed on a nonconductive surface.
- A conductive plastic grounding strap with a clip on both ends. In use, the wrist strap usually is fastened to the conductive workbench cover which is, in turn, grounded by the grounding strap. No microcircuit device or assembly should be handled until the wrist strap is attached at both ends.

For use in handling small assemblies, there is a workstation containing a benchtop cover of conductive felt instead of plastic. The softer material protects polished surfaces from damage and can be folded to put awey when not in use.

Conductive rubber floor mats are common in microcircuit plants, but are not among the precautions recommended for the hobbyist because of cost.

In certain parts of the country, or at certain times of the year, added precautions might be necessary because static electricity builds to higher levels when the air is dry. Other devices for preventing the user from "blowing out" microcircuits include seat covers and shoe covers.

Some precautions are recommended by microcircuit manufacturers even when conductive plastic antistatic products are employed. Those that appear most often on manufacturers' instructions to users are:

- Never touch the pin of an MOS device or the "chip" itself.
- Wear a cotton smock or other outer garment. (Synthetic materials are excellent producers of static charges.)
- If handling a newly purchased microcircuit, leave the device in the protective container until it is ready to be installed. Individual microcircuits are usually shipped in a padding of conductive foam plastic. The pins are inserted into the foam to hold the devices in place while giving maximum conductivity.
- Ground tweezers or other hand tools that come into contact with the device.
- Keep candy wrappers, cigarettes or other foreign objects away from the work area.
- No power should be applied for testing or any other purpose until all leads of the microcircuit are attached.
- Do not have a carpet on the floor. If it cannot be removed, cover it with a conductive material.

The MOS failures that the hobbyist should be most concerned about are not the catastrophic failures that occur during handling, but the permanent shifts in parameters that cause failures long after assembly. These are not easily detected during assembly and go unnoticed.

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CI Notes

Logical Machines Takes Byte, Inc.

SUNNYVALE, Calif. — The Logical Machine Corp. has acquired Byte, Inc., a retail store chain that specializes in microprocessing equipment and computer-related literature.

Comprised of nearly 60 dealerships throughout the country, Byte, although wholly owned by Logical, will remain an independent subsidiary, a spokesman said.

Byte agreed to the purchase in the hopes that Logical will provide the guidance and financial backing necessary for future expansion, Jerry Brandt, Byte president said.

Byte is currently composed of two primary divisions, distribution and manufacturing. The distribution division supplies the dealers with periodicals, manuals, microprocessors and other computing equipment.

The manufacturing division produces a microprocessor that is sold as an integrated system through the various dealerships.

Britannica to Honor HP Board Chairman

CHICAGO — David Packard, chairman of the board of Hewlett-Packard Co. and former Deputy Secretary of Defense, is one of the nine men and women who will be honored this month with a 1978 Encyclopaedia Britannica Award for Achievement in Life at a dinner here.

Packard will receive his award for achievement in business.

The selection of the Britannica award winners was made on the basis of contributions to society in the areas of government, business, science, the arts and education; significant personal achievement — the setting and accomplishing of meaningful goals in their own lives; and dedication to knowledge and human enlightenment.

An early interest in science and engineering led David Packard to help found HP in 1939. He received his bachelor's degree in electrical engineering from Stanford University and has been honored with doctorates from five universities. Between 1969 and 1971, Packard served as Deputy Secretary of Defense.

Coleman SIA Head Again

SAN FRANCISCO — Bruce T. Coleman, president of Boole & Babbage, Inc., was reelected president of the Software Industry Association (SIA) and elected to the board of directors of the Association of Data Processing Service Organizations (Adapso) at the recent Adapso meeting here.

SIA, the software section of Adapso, promotes "the integrity of the software products and services industry for the business community and general public," the society said.

Asks Supreme Court Review

IBM Takes Greyhound to Top

By Molly Upton
CW Staff

WASHINGTON, D.C. — IBM has petitioned the Supreme Court to review the appeals court decision that ordered a new trial in the antitrust case filed against it by Greyhound Computer Corp.

The U.S. Court of Appeals for the Ninth Circuit recently ordered a new trial for the case [CW, Aug. 29] that had been dismissed with a directed verdict — for insufficient evidence — by a district court in 1972.

The appeals court ruled that the case should go to a jury and that Greyhound had established a case by "showing IBM employed exclusionary tactics to maintain an existing monopoly in the lease market."

IBM's brief to the Supreme Court focused on the portion of the appeals court decision that stated "the jury could have concluded that IBM maintained its monopoly power in the leasing of general-purpose computers in part by practices that unnecessarily, even deliberately, excluded leasing companies from an opportunity to compete."

The appeals court judgment should be reversed because it "intimidates vigorous competition on the merits," burdens lower federal courts and harms defendants, including IBM, the IBM brief stated.

"Surely the effect of such a decision is to spawn litigation by those unsuccessful in the competitive marketplace; to impel successful companies to 'soften' their competitive activities so as to avoid the expense and penalties of such litigation; and hence to suppress that 'free and unfettered competition' which the Sherman Act was enacted to protect and encourage," IBM stated.

Honest But 'Unnecessary'

IBM challenged the opinion that lawful, honest business acts that might "exclude unnecessarily" competitors were in violation of the antitrust statute.

IBM labeled as a "self-evident erroneous position" the court's stance that "normal competitive acts were unlawful if 'unnecessary' even if taken outside of the market in which the power supposedly exists and in the market in which no power is possessed or was even claimed."

IBM's brief dealt with a number of principles enunciated by the appeals court, including:

- Whether a jury could find any firm could monopolize a submarket such as leasing, distinct from a submarket of purchasing.
- Whether a jury could find IBM possessed monopoly power in the lease submarket almost entirely because IBM had a large share of that submarket, despite factors that would tend to disprove classical definitions of monopoly.

IBM asked whether the appeals court erred in holding that a jury "could find that IBM was liable for an attempt to monopolize where it was assumed that 'the record would not support a jury finding of even a dangerous probability of monopolization' by IBM of any 'appropriate market.' "

Since the plaintiff offered no testimony "even attempting to calculate such damages" and the jury would therefore have to speculate on the amount of damages supposedly sustained, IBM also asked whether the court of appeals erred in holding that Greyhound had offered sufficient evidence of damages to put the case before a jury.

"The judgment appealed from, in total effect, condemns competition. If allowed to stand, it would make the Sherman Act a restraint of trade," the IBM brief contended.

Bubbles Won't Mature Until '80, CSI Predicts

SAN JOSE, Calif. — The bubble memory will not be a viable competitor to semiconductor memory until 1980, according to a study by Creative Strategies, Inc. (CSI) here.

Although bubble technology is "glamorous," CSI said such memories will not be commercial realities until their density increases by a factor of 10. That is expected in the 1980 time frame.

After the introduction of a 1M-bit bubble memory chip, however, the market expansion should be rapid, the firm predicted in a report on "Semiconductor and Bubble Memories," available for $595.

At the same time, the report noted the semiconductor memory market is growing rapidly, largely at the expense of core memories.

"The ferrite core memory is being phased out in all computer designs, so by 1980 very little core memory will be in production," CSI predicted.

Semiconductor memory had a shipment rate of 100 million units in 1976 and "will easily" exceed 200 million units by 1981, CSI said, when the total number of semiconductor memory bits will exceed one trillion.

The overall market for semiconductor and bubble memory will grow at an annual rate of 25% over the next several years, from $471.6 million in 1976 to $1.42 billion by 1981, the report forecast.

CCDs Too Costly

Along with bubble memories, charge-coupled device (CCD) memory will also become available in a large enough size to be attractive by 1980, the report said.

"However," it added, "the CCD devices will not become inexpensive enough to capture a large market."

Caught between large dynamic NMOS arrays and bubble memories, CCDs will be squeezed into a small market niche, capturing only 2% of total memory sales by 1981, according to CSI.

The NMOS dynamic random-access memory (RAM) will continue to account for the largest share of this market, the report said, with a compound growth rate of 27% through 1981, when this technology will account for $422 million in shipments.

MOS static RAM shipments will increase at a rate of 37% annually, growing along with the microcomputer market, the report said.

Appeals Court Strikes Down AT&T Plea in Milgo Case

DENVER — In the latest action in the patent infringement suit filed by Milgo Electronic Corp. (now Racal Milgo, Inc.) against AT&T, one of its subsidiaries and a Bell System operating company, an appeals court has dismissed a plea by AT&T asking for reversal of two orders handed down by the Federal District Court in Kansas.

The first order dismissed by the Federal Appeals Court of the 10th Circuit was a discovery order that allowed a Milgo expert access to certain AT&T technical documents.

The second was a request to have the case moved from Kansas to the U.S. District Court for the Southern District of New York.

Milgo filed the suit in early 1976 against AT&T, Western Electric Co., Inc., Southwestern Bell Telephone Co. and Boeing Computer Services, Inc., a user of AT&T modems in Wichita.

Milgo alleges the Dataphone 208 and 209, modems made by Western Electric, infringe on four of Milgo's patents.

One patent allegedly being infringed involves the narrow band concept of transmission which allows modems to transmit data at high speeds over voice-quality telephone lines.

The district court in Kansas has not set a trial date for the suit.

Could Store 10 Times More Data

IBM Researchers Testing 1K Bubble Lattice

SAN JOSE, Calif. — IBM researchers here are experimenting with a 1K bubble lattice chip in what IBM claims is the first time the bubble lattice concept has been tested in a fully operational device.

Previous experiments with the lattice concept have indicated it holds promise for storing up to 10 times as much information in a given area as is possible with any other type of magnetic bubble device, according to IBM.

The device and its operating characteristics were discussed in a paper presented by the IBM researchers at the recent Conference on Magnetism and Magnetic Materials in Minneapolis.

Like other approaches to magnetic bubble technology, the bubble lattice stores information in the form of magnetic bubbles, which are tiny cylinders of reverse magnetism formed in a thin layer of a magnetic material such as crystalline garnet.

Microcircuit patterns deposited on the surfaces of these films provide pathways along which the bubbles can be moved under control of an applied magnetic field or electric current.

The bubble lattice device has a capacity of 1K information-bearing bubbles in its storage area, Each one of these bubbles represents a single bit of information. They are arranged — like cylinders in the cells of a honeycomb — in a hexagonal array consisting of 32 rows and 32 columns.

5 Micron Diameter

The bubbles have a diameter of 5 microns and in the array their center-to-center distance is 11.5 microns. This gives a storage density of over 5 million bits per square inch.

In other types of magnetic bubble devices, information is represented by the presence or absence of bubbles at particular locations in the device.

In such devices, the bubbles must be kept four to five bubble diameters apart in order to prevent them from interfering with each other.

In bubble lattice devices, however, the bubbles can be packed much more closely together, giving an inherently higher storage density for the same size bubble, IBM said.

Since every location in the lattice must always contain a bubble, however, information cannot be recorded or sensed as the presence or absence of a bubble. Instead, it is represented by differences in the magnetic structure of the thin, tubular "domain wall" that surrounds each bubble.

This structure can be forced into either of two magnetic states to represent "ones" and "zeros."

Shifting Array

To read information out of a lattice, the entire array is shifted left or right until the column containing the desired information becomes aligned with an "access channel" pair of narrow conductor lines deposited on the surface of the device.

The bubbles in that column are then shifted out of the lattice one by one until the desired information is reached. Whenever a bubble is shifted out of the lattice, another one, with the same information content, must be entered at the rear of the column to prevent the lattice from collapsing.

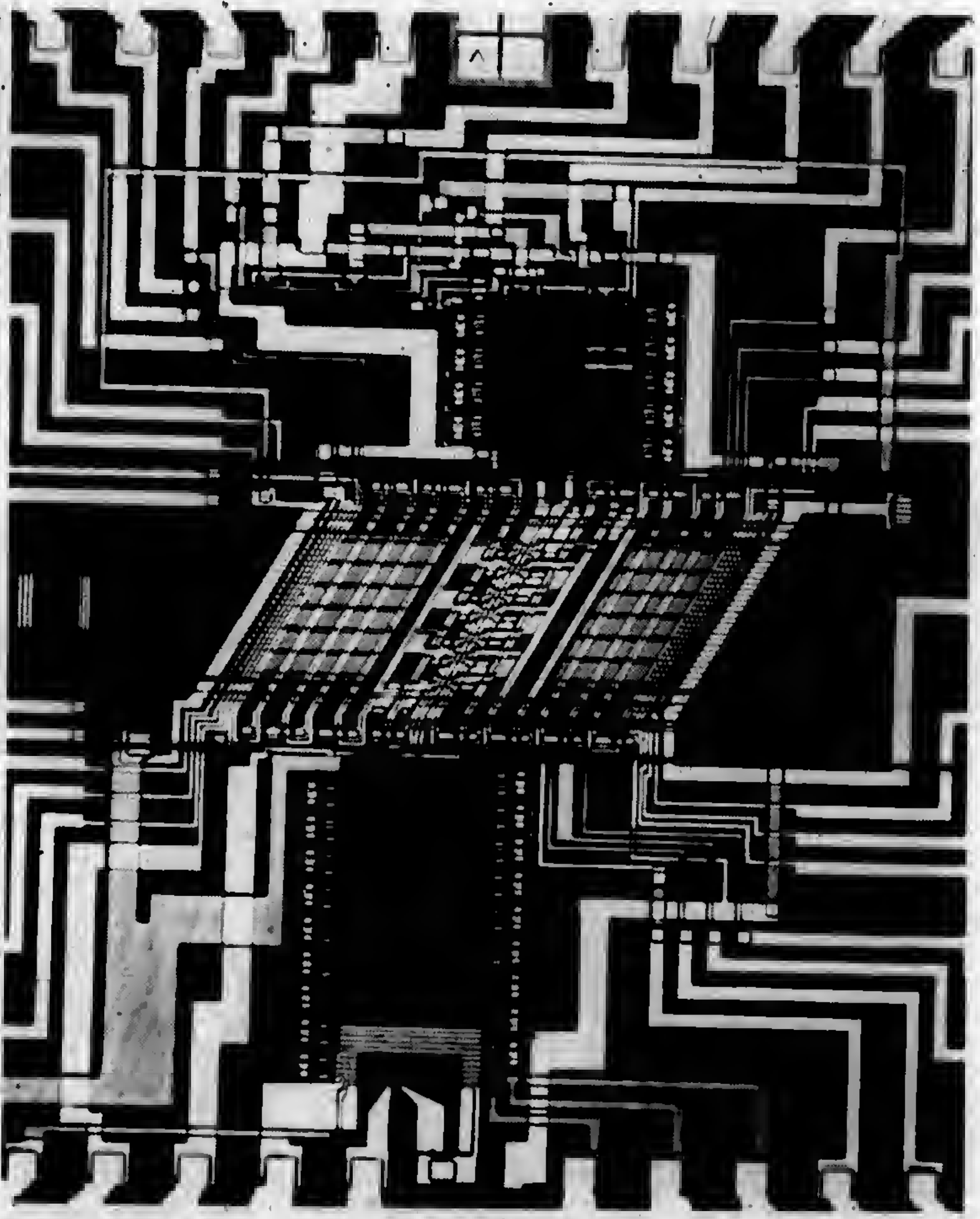
The information stored in a particular bubble is detected by noting whether it moves forward along the line of the column when it is removed from the lattice (a "zero") or at a 30° angle from the line of the column (a "one").

Three Sectors

The experimental bubble lattice chip is divided into separate areas for performing the three main functions of a storage operation. These are:

- The storage area itself, in which the bubbles are organized into a hexagonal array and the array is shifted to an access channel. The array has the form of a parallelogram about 1/64-inch long.
- The write station, in which isolated bubbles are generated and binary information is inserted by controlling the structures of the bubble walls.
- The read station, in which the wall states of isolated bubbles are determined and the bubbles destroyed after their information content is read.

The magnetic material used to fabricate the device is a thin film of crystalline yttrium iron garnet 3.6 microns thick. Besides having desirable magnetic properties, this material is electrically insulating, IBM said.



The 1K bubble storage area appears as a parallelogram in the center of this picture of IBM's experimental bubble lattice device.

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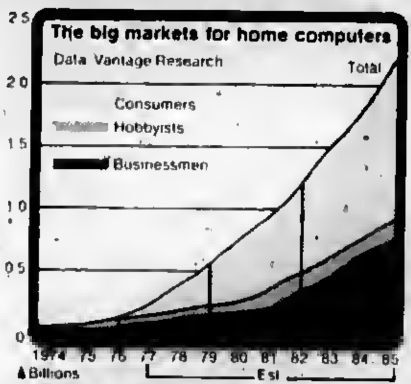

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Data Base Business Seen at $1.1 Billion by 1980

NEW YORK — Spurred by the business sector, data base-generated revenues should climb from $740 million in 1976 to $1.1 billion by 1980 and $1.6 billion by 1985, according to a study from Frost & Sullivan, Inc. (F&S) here.

The sale of information contained in electronic data bases faces a future with almost "no limits," the report added.

Companies in the field already maintain business, technical, economic, legal, medical and other information in data bases, F&S noted. The final product is delivered in the form of a computer printout or computer tape or via a CRT display, the firm added.

The fastest growing segment of the data base market is that for business information, F&S said, predicting a 25% annual growth rate in this sector through 1980.

This area of growth will be followed by economic and econometric data at 20%, legal research at 20% and securities data, scientific data, business credit and specialized marketing information all at an expected 10% growth rate, F&S said.

Publishers, banks, research organizations, time-sharing companies and specialist firms are among the many newcomers to the business, the report said. The industry's customer list, now limited mainly to big corporations, government agencies and technology-oriented nonprofit organizations, is expanding to include medium-size and small companies, it added.

Such market expansion is the result of declining costs, according to the market research company. A complex data base search on a computer costs $15 today, compared 10 years ago with $1,000, F&S claimed.

That cost erosion will continue as optical scanners and word processing systems create machine-readable tapes automatically. Also, coding and indexing systems are continously being approved to simplify search procedures, and eventually standardized retrieval systems will evolve, the report predicted.

Technology advances will also enable vendors to add more value to their services. As computer memory costs decline, vendors will store bibliographic material in full text form rather than as just abstracts, as they now do.

Declining memory costs will also give rise to data bases that cover engineering drawings and other graphic materials, according to the report.

The industry can be classified according to two operational modes, F&S said. An on-line segment connects customers to a data base via a terminal and the telephone network. This sector, "though adolescent, is fast growing" and populated with new companies, the study pointed out.

As an added new business twist, such on-line vendors rely on so-called "value-added" carriers, such as Tymnet and Telenet, to transmit information to and from customers at low cost.

The other, traditional batch mode end of the business that makes heavy use of the mails to initiate and respond to queries is "large and mature." This sector is dominated by big old-line companies, like Dun & Bradstreet and A.C. Nielsen, F&S said.

An industry trend under way, however, is to computerize these data bases and put them on-line as well, the company noted.

Expansions

National Data Corp. has consolidated its Reno, Nev., operations into its Atlanta Communications Center, Corporate Sq., Atlanta Ga. 30329.

Imlac Corp. has established Imlac House, a fully staffed facility in Amersham, England, to provide sales and service of all Imlac products sold in Europe and the UK.

Pertec Computer Corp.'s Microsystems Division (MSD) has transferred its Altair Users Group Software Library and its Altair Software Distribution Co. from Atlanta to divisional headquarters at 21111 Erwin St., Woodland Hills, Calif. 91367.

Azurdata, Inc. has shifted its manufacturing operations to its new 30,000 sq-ft facility in Richland Skypark, Wash. A duplicate 30,000 sq-ft addition is scheduled for construction in 1978.

Qume Corp. has begun construction of a $10 million manufacturing plant and headquarters facility in San Jose's International Business Park.

Centronics Data Computer Corp. has established a subsidiary in Italy, with headquarters in Milan. It is located at Via Santa Valeria 5, 20123 Milan, Italy.

Data Card Corp. has begun building a 112,000 sq-ft facility to house its international headquarters in Minnetonka, Minn.

The Kennedy Co. has leased a 35,000 sq-ft facility in Altadena, Calif., to house its machine shop, sheet metal fabrication and circuit board manufacturing and replace its Glendale facility.

Business Systems Products, Inc. has leased 1,904 sq ft of office space in the Carson Plaza Drive, Carson, Calif. The company will use the three suites to demonstrate and sell its Advisor line.

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TAB

Report Paints Profit Picture in DDP/Mini Mart

WALTHAM, Mass. — In the minicomputer/distributed data processing marketplace, suppliers depending primarily on third-party channels — distributors and OEMs — to market their products are generally more profitable than those who market directly to end users.

That's one of the conclusions in a recent report in the *Distributed Processing Newsletter*, published by International Data Corp., an industry research firm here.

In addition, the newsletter said that as a group, companies with more than $50 million in revenue showed a slightly higher profit margin than companies with lower revenues and that those in the $50 million to $200 million range fared best.

Furthermore, the fastest growing companies have experienced the highest profit margins over the past five years, the newsletter said, adding that companies which have concentrated on only one of the product areas in the mini/DDP field have experienced slightly higher profit margins than those with multiple product lines.

The most profitable firms in the study were IBM, Intel and Data General, the newsletter said, with margins of 28%, 23% and 23% respectively. Overall, the weighted average for the 35 companies studied was 19%, but if IBM were taken out of the study the overall average would be 9.5%, it added.

The minicomputer makers also outranked all others on the amount spent for research and development as a percent of their gross revenues, the report said, and in the ratio of assets to liabilities.

By category, the weighted profit margins stacked up this way: General-purpose computer makers 21.3% (8.2% without IBM), minicomputer makers 14.6%, small business computer makers 13.8%, component and microprocessor makers 10.7%, and processing terminal [data entry] makers 8.0%. The leaders in each of their respective categories were IBM, DG, Mini-Computer Systems, Intel and Incoterm.

Orders & Installations

Pennsylvania's Department of Revenue has signed a contract with A.B. Dick/Scott for 13 System 200 microfiche processors.

The Chicago Board Option Exchange has ordered Data General Eclipse C/330s and Nova 3/12s from Monchik-Weber Associates, Inc. to aid in development of a system to handle orders from the floor.

Citibank of New York has installed the Hiross Denco "Over 32" environmental control system for its Troy, N.Y., DP facility.

Cagle's, Inc. of Atlanta ordered a Univac 90/30 system for inventory control of poultry. The 90/30 replaces an IBM 3/15B.

American Airlines has contracted with Conrac Corp. to supply and install an Intelligent Flight Information Display System in its terminal at San Francisco International Airport.

The Cuyahoga County Public Library in Cleveland has ordered a Honeywell Information Systems Level 62 valued at $117,000.

Medical/Dental Data Concepts, Inc. of Tempe, Ariz., has ordered a Microdata Corp. Reality system from Escom Arizona.

Security Pacific Mortgage Corp. of Denver has ordered a Honeywell Information Systems Model 66/05 system valued at $807,000.

Taiwan Telephone Association has awarded the Alston division of Conrac Corp. a $500,000 contract for its computerized telephone traffic analysis system.

Medidentic, Inc. of Park Ridge, Ill., has ordered two CMC 3 Keyprocessing systems from Pertec Computer Corp.

Fisher-Price of East Aurora, N.Y., has ordered a Univac 1100/21 system valued at about $3 million as a replacement for its 1106.

Oklahoma State Univesity signed a long-term lease agreement with Inforex, Inc. for a System 7000.

The Peninsular Motor Club of Tampa, Fla., has ordered a Honeywell Information Systems Level 62.

The City of Hope National Medical Center in Duarte, Calif., has ordered a Univac 90/30 system.

The Southeastern Kentucky Baptist Hospital has installed a Honeywell Information Systems Level 62 valued at $105,000 to perform patient accounting and administrative functions.

Pentel of America, Ltd., headquartered in Torrance, Calif., has ordered a Univac 90/30 and two 90/25s valued at about $500,000.

AZS Chemicals of Atlanta has ordered a Univac 90/30.

The J.I. Case Company Credit Corp. of Racine, Wis., has ordered an Installment Loan System from University Computing Co. of Dallas.

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To Broaden Media Offerings

EMM to Acquire Group/3 From Informatics

HAWTHORNE, Calif. — Electronic Memories & Magnetics Corp. (EMM) has agreed to acquire Group/3 from Informatics, Inc.

The move is an extension of the firm's commitment to the media business and enables EMM to supply a broader range of media products, a spokesman said.

Group/3 sales and marketing will be moved here to EMM's facility while manufacturing and distribution will be handled in San Jose, where EMM's Media Products Division is based.

In fulfilling its growth requirements, EMM has emphasized guaranteed satisfaction to its media customers, the spokesman added.

By letting customer needs be its guide, the firm has expanded into the flexible diskette market from disk packs and cartridges.

Thus users are able to "fill their data storage and retrieval media needs from one source," according to Roger Evans, general manager of the Media Products Division.

EMM's involvement in the media business began in 1969 when it acquired Caelus Memories, Inc., a maker of disks. The Caelus line now includes over 150 versions of disks and diskettes.

In 1976, the firm sold part of its media operation to Univac, which enables it to purchase coated disks to its specifications from a variety of sources "at a cost less than we could coat the disk ourselves," Evans said.

Profitable Step

This action substantially improved EMM profit and cash generation. "The division has the manufacturing capability necessary to support its commitment to the media business. The future will be approached on a controlled basis with continuing emphasis on product quality and customer service," Evans said.

"We plan for a full line of media products and computer supplies. Our intent is to stay very close to the computer room and those supplies required to support computer operations," he added.

EMM's emphasis will be to serve and expand its media customer base, develop media business within the memory customer base and pursue new accounts.

Areas of Expansion

Heaviest revenue impact in 1977 comes from IBM compatible products predominantly in the 3330 Model I and Model II areas. According to Evans, "areas in which we are expanding include non-IBM compatible disk packs and cartridges, flexible diskettes and customer service including cleaning, verification and refurbishing of media regardless of original manufacturer or type."

EMM provides both sales and lease in addition to a refurbishment service. Again, EMM has stood by the old cliche of "what's good for our customers is good for us." Leasing has turned out to be extremely profitable for the company and the company has developed a strong lease base in media as well as 360/370 add-on memories.

"Since we had the resources to cater to our customers' needs, it was quite easy to offer various financial plans — sale or lease," Evans said.

Customer-owned packs can be returned to the San Jose facility for refurbishment — about 15% of the business. This combination provides for a balanced operation.

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Intel Splits Micro Division

SANTA CLARA, Calif. — Intel Corp. said it has split its microcomputer division into a components division and a systems division in an effort to better align marketing design and manufacturing operations to serve customers more efficiently.

The microcomputer components division, which includes processors and peripherals, is headed by Les Zadasz, formerly assistant general manager of the microcomputer division.

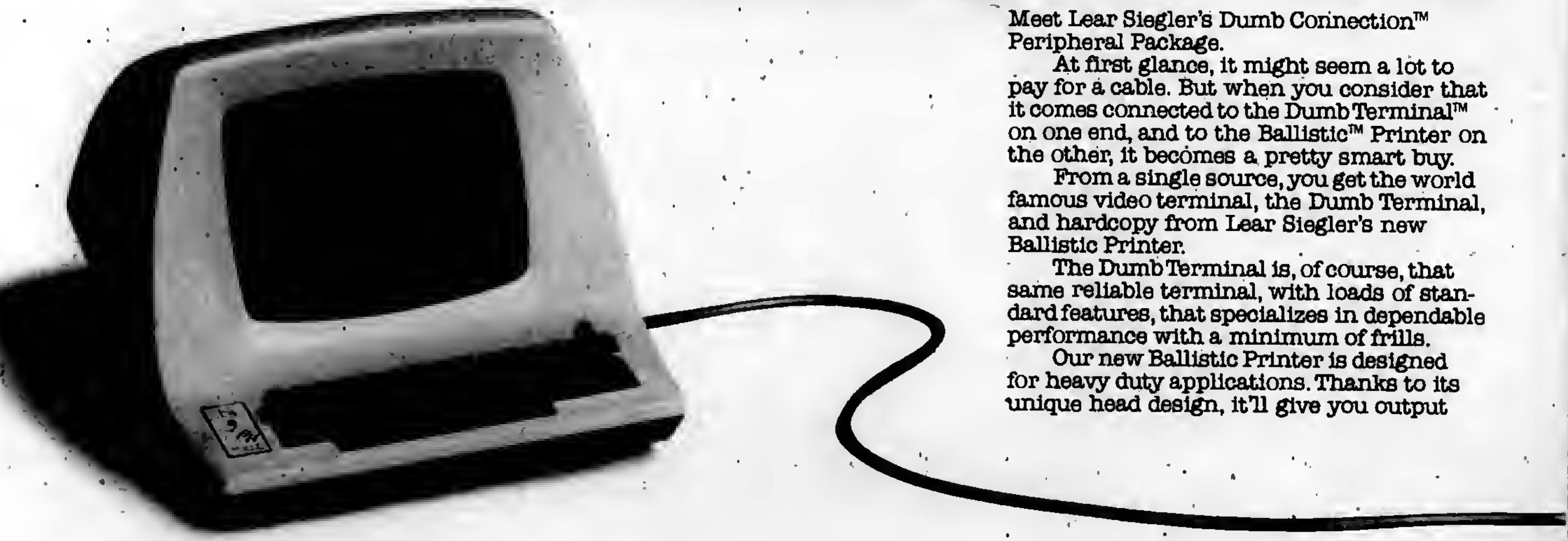
Systems Division

The microcomputer systems division will be under Dr. Bill Davidow, who was head of the single division, and will include all systems and board-level microcomputer products.

Furthermore, the firm has designated a new components group, under E.L. Gelbach, that includes two product-oriented divisions with responsibility for product marketing, design and operations.

The memory components division will be responsible for all dynamic and high-speed static (random-access memories (RAMs) while the special products division will handle static RAMs, read-only memories (ROMs), and erasable programmable ROMs and bipolar memory products.

Introducing the $3890



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Ream Hits Cost of Proposed I/O Fips Revision

By Molly Upton
CW Staff

SAN CLEMENTE, Calif. — Operational overhead and additional cost will result from the revised implementation segment of the proposed I/O channel-level interface standard, according to Norman Ream, former head of the National Bureau of Standards' (NBS) Institute for Computer Sciences & Technology.

Under the revision proposed by NBS for the draft Federal Information Processing Standard (Fips), federal systems would be allowed to have more than one type of I/O channel-level interface, he explained.

In a letter to Jordan J. Baruch, assistant secretary for science and technology in the Department of Commerce, Ream provided the specifics missing from an earlier letter to Secretary of Commerce Juanita Kreps. That letter said the proposed standard "makes a mockery of the Federal DP standards program" and is "unenforceable" [CW, Sept. 12].

Cost Benefits

Ream pointed out that the standard contains no requirement that government agencies measure the cost benefits of a system configured both with and without the standard.

Furthermore, the proposed Fips contains no reference to overall systems life. "How do you propose to benchmark the system as required ...?"

Numerous problems could arise under the section that requires a system to support a minimum of one standard interface, but which also allows a maximum of four, Ream contended.

"There does not appear to be any logical reason for allowing more than one type of I/O channel interface on a system," he observed. "The operational problems created by such a 'mixture' are not comprehensible, nor is the 'maximum of four' an understandable constraint.

"The use of mixed channels on a system will require major changes in the operating system, will severely increase the [operating system's] overhead cost and will severely handicap the system throughput," according to Ream, now based in San Clemente.

For example, the system will need complete software support for each type of channel, thus more overhead and a larger operating system.

There would also be separate access methods for the different types of devices on these different channels, and different protocols for different channels affects the program status word and channel address word, he said.

Error Recovery

In addition, the system would need separate error recovery logic, he pointed out.

Nowhere does the implementation section of the proposed Fips mention who will bear the cost of software modification or who will furnish the increased operations software requirements, Ream noted.

The provision that the government can initially acquire a system without any interfaces conforming to the standard "is an 'open road' to avoidance of the standard and will be used as such," Ream remarked.

If such a provision is to exist, it should minimally require the manufacturer to demonstrate the capability to meet it and furnish all software requirements to continue the operability of the CPU, he stated.

The provision should require "that the associated costs and also the capability of the system when the standard is employed be part of the total evaluation process." Currently the proposed implementation only refers to "the cost," he added.

Further, the provision should require the comparison of cost for peripherals furnished both by the system maker and by outside sources, he stated.

Ream deplored the section that grants agency heads the authority to waive the requirements. "Once again the Department of Commerce and NBS are shirking their responsibilities," he charged. "Congress has made very clear its opinion that waiver of a Fips should be granted only by NBS and should not left to the discretion of an agency head."

He recommended redrafting the implementation portion of the document and also providing for two phases of implementation.

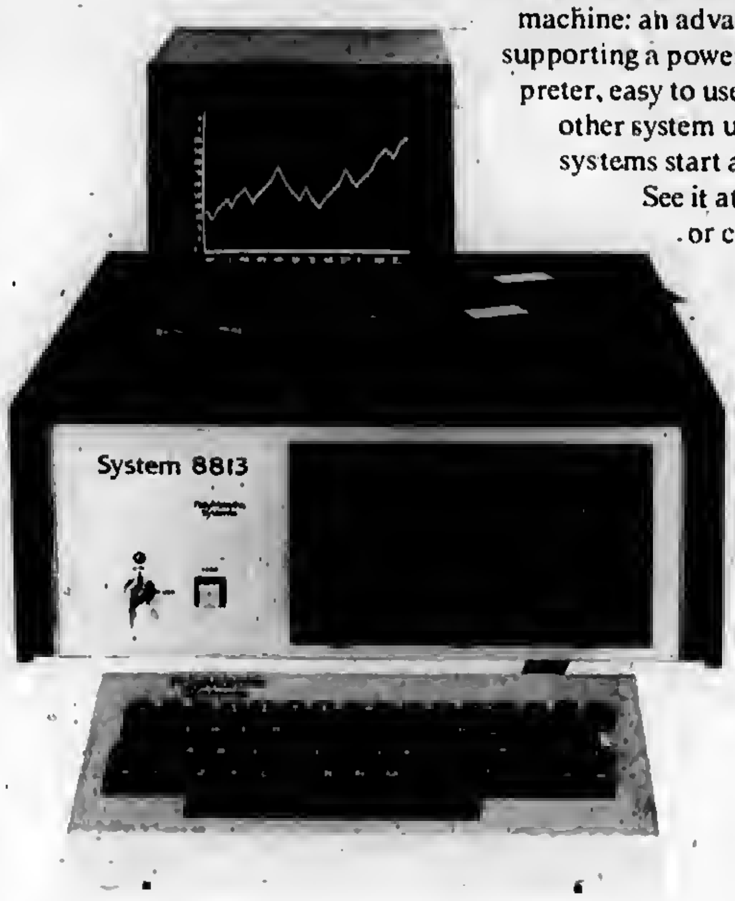
The first phase would require suppliers of CPUs to the government to furnish the standard channel-level interface for those CPUs announced and demonstrated as of the effective date of the standard.

The second phase would involve requiring suppliers to do the same on CPUs not announced and not demonstrable on that date.

Should the Commerce Department decide not to adopt those suggestions, Ream asked that it publish at the end of the first year of implementation the number of applicable CPUs that have adopted the waiver procedure and the number that have actually employed the standard.

Cbema Elects Chairman

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) has elected Roy L. Phelan, vice-president for research and development at NCR, to be the 1977-1978 Cbema chairman of the board.



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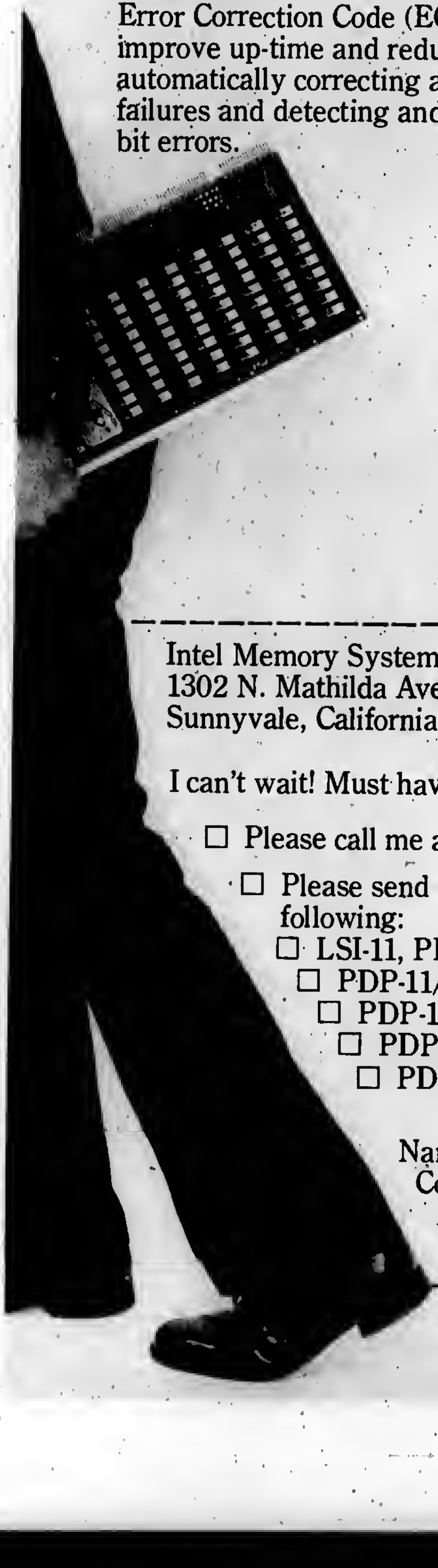

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Earnings Reports

ELECTRONIC ARRAYS
Three Months Ended Sept. 30

	1877	1976
Revenue	$3,391,000	$3,551,000
Loss	754,000	1,487,000
6 Mo Rev	6,600,000	6,600,000
Loss	1,663,000	1,342,000

ELECTRONIC ASSOCIATES
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.06	.....
Revenue	6,764,000	$6,164,000
Tax Cred	15,000	12,000
Earnings	158,000	(760,000)
6 Mo Rev	17,656,000	17,905,000
Tax Cred	102,000	278,000
Disc Op	.....	544,000
Loss	960,000	1,132,000

ELECTRONIC DATA SYSTEMS
Three Months Ended Sept. 30

	1977	1676
Shr Ernd	$.34	$.26
Revenue	46,226,000	35,706,000
Earnings	4,262,000	3,287,000

HEWLETT-PACKARO
Year Ended Oct. 31

	1677	1676
	(000)	(000)
Shr Ernd	$4.27	$3.24
Revenue	1,360,100	1,111,600
Earnings	121,500	90,800
3 Mo Shr	1.14	1:18
Revenue	378,200	316,700
Earnings	32,600	33,400

HONEYWELL
Three Months Ended Sept. 30

	1977	1976
	(000)	(000)
Shr Ernd	$1.70	$1.60
Revenue	T11,562	a636,464
Tax Cred	2,304	1,384
Earnings	35,984	b36,959
8 Mo Shr	4.56	3.43
Revenue	2,060,639	a1,T84,063
Tax Cred	6,T16	4,620
Earnings	86,478	b66,666

a-Restated. b-Includes capital gain of about $12 million from sale of part of Honeywell's interest in Honeywell Bull.

INFOREX
Three Months Ended Sept. 30

	1877	e1976
Shr Ernd	$.29	$.24
Revenue	16,T34,000	15,601,000
Tax Cred	140,000	60,000
Earnings	841,000	708,000
9 Mo Shr	.60	.53
Revenue	46,764,000	45,664,000
Tax Cred	296,000	261,000
Earnings	1,761,000	1,660,000

e-Restated.

INFORMATION INTERNATIONAL
Three Months Ended Oct. 31

	1977	1676
Shr Ernd	$.18	$.17
Revenue	3,403,345	3,732,861
Earnings	423,404	457,570
6 Mo Shr	.23	.36
Revenue	5,897,226	7,663,109
Earnings	606,975	1,205,663

INTEL
Three Months Ended Sept. 30

	187T	1976
Shr Ernd	$.73	$.83
Revenue	a73,349,000	61,679,000
Earnings	7,746,000	8,751,000
9 Mo Shr	2.17	1.62
Revenue	e206,297,000	15T,967,000
Earnings	23,034,000	17,256,000

s-Includes $1.5 million proceeds from sale of EG&G common stock.

ISM
Three Months Ended Sept. 30

	19T7	1976
	(000)	(000)
Shr Ernd	$4.68	$3.90
Revenue	4,565,696	3,957,292
Earnings	690,362	566,901
8 Mo Shr	12.82	11.47
Revenue	13,095,063	11,T65,824
Earnings	1,922,035	1,T24,095

ITEL
Three Months Ended Sept. 30

	1977	e1878
Shr Ernd	$.75	$.48
Revenue	88,300,000	61,700,000
Earnings	8,400,000	4,000,000
9 Mo Shr	1.62	1.21
Revenue	282,300,000	163,400,000
Spec Cred	b600,000	.....
Earnings	18,700,000	10,200,000

a-Restated to reflect acquisition on a pooling-of-interests basis. b-Consists of $1.6 million gain from accounting change, less $1.1 million loss from redemption of debentures.

ANACOMP
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.22	a$.21
Revenue	5,177,345	2,928,466
Earnings	293,611	232,859

a-Adjusted for 10% stock dividend paid in September 1977.

KEANE ASSOCIATES
Three Months Ended Sept. 30

	1977	1876
Shr Ernd	$.14	$.11
Revenue	1,874,000	1,392,000
Earnings	116,000	60,000
9 Mo Shr	.36	.26
Revenue	5,326,000	4,066,000
Earnings	308,000	243,000

ALANTHUS
Year Ended Aug. 31

	1977	a1676
Shr Ernd	$.63	$.46
Revenue	37,676,000	29,129,000
Earnings	1,841,000	746,000

e-Restated

CALIFORNIA COMPUTER PRODUCTS
Three Months Ended Oct. 2

	1977	1678
Shr Ernd	.....	$.06
Revenue	$26,373,000	30,513,000
Earnings	(587,000)	287,000

APPLIED DATA RESEARCH
Three Months Ended Sept. 30

	1977	1876
Shr Ernd	$.30	$.3t
Revenue	6,126,551	3,634,07T
Tax Cred	....	21,000
Earnings	412,69t	361,150
6 Mo Shr	.65	.93
Revenue	14,751,955	11,166,674
Tax Cred	.....	364,000
Earnings	1,157,178	1,136,818

BRAOFORO NATIONAL
Three Months Ended Sept. 30

	1977	1678
Shr Ernd	$.23	$.10
Revenue	23,866,000	15,476,000
Tax Cred	18,000	.....
Earnings	653,000	386,000
9 Mo Shr	.67	.81
Revenue	66,494,000	46,786,000
Tax Cred	186,000	.....
Earnings	2,730,000	2,463,000

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85 Government-Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other: ____________

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13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
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51 Mfg. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: ____________

Eger: Competitive AT&T Vital to Technology

CHICAGO — Free and responsible competition from such corporate giants as AT&T is essential to furthering U.S. technology in the computer/information industry, a former White House telecommunications policy-maker told the City Club of Chicago recently.

AT&T's future "lies in the marriage of AT&T's existing network with the symbol of this information age in which we live — the computer," according to John Eger, who headed the White House Office of Telecommunications Policy for two years during the Ford Administration.

"That is where AT&T ought to be focusing its resources — both financial and intellectual," Eger said.

"AT&T must stay ahead. It must develop the most efficient and effective means of meeting the demands of the marketplace. It's got the technology; it must continue to enrich it.

"If that takes doubling or tripling capital investment, then AT&T should make that expenditure. And if it asks where the money is to be found, I direct it to the North American Telephone Association's 1976 submission to the Federal Communications Commission."

That document "concluded that, by accepting an end to its monopoly of the terminal equipment industry — by competing freely in the interconnect industry — AT&T can rid itself of a part of its business that fails to produce a proportionate share of profit and eats up potential reserves," Eger said.

"It is more important to the information society which AT&T serves for AT&T to do extremely well in research and development in the information industry, without monopoly protection, in open, uninhibited competition with others in the field so that the consuming public and the U.S. economy benefit from innovation stimulated by innovation," he contended.

"It is more important that America's technological lead in the information industry be preserved. That is worth doing, and AT&T is capable of doing it well," Eger concluded.

Games Growing 18% by '82

MENLO PARK, Calif. — Total U.S. production of games and amusements, both electromechanical and electronic types, will exhibit an average annual growth rate of 18% during the 1976-1982 period, according to a recent study by Gnostic Concepts, Inc.

Electronic games and amusements accounted for 65% of the total production of games and amusements at the start of this time interval; by 1982 this sector of the overall market will approach 94% of the total, according to Gnostics' estimate.

Programmable home game units will become increasingly important during the 1976-1982 timeframe, the report said, noting the microprocessor-controlled game unit for educational or other nongame uses, including programmed financial aids, is the next step toward a home computer.

Gnostic Concepts is located at 2710 San Hill Road, Menlo Park, Calif. 94025.

Foreign Orders & Installations

The Supreme Court of Japan has ordered a Univac 90/30 system to prepare annual judicial statistical reports.

The National Bank of Poland has installed an NCR Century 251 system to process savings accounts.

Taiwan Telecommunications and Telephone Administration has ordered seven Hewlett-Packard Co. 1000 series computers and peripherals worth more than $850,000 to modernize the present manual method of finding customer phone numbers. The specially designed CRT terminals have keyboards which accept a Chinese phonetic code.

Tokyo Electric Power Co. has ordered eight Univac 90/80 computer systems from Nippon Kaisha Ltd., the Univac marketing organization in Japan.

The Simulation and Electronics Division of LMT has purchased a SEL 32/55 computer system from Systems Enginering Laboratories SA, Paris, for use in the training via simulation of Eastern Airlines crews to fly the A300 Airbus.

Systemshare Ltd. of Edinburgh, Scotland, has installed a Honeywell 66/07 computer valued at more than $1.2 million.

Superior Office Supplies in Montreal has installed a Mobus Industries 18-terminal Digital Equipment Corp. PDP-11/70.

The province of Alberta, Canada, has awarded two contracts for traffic control systems valued at almost $1 million to Honeywell Corp.

Ackermann in Entlebuch, Switzerland, a large fashion mail order house, has ordered a Univac 90/60 system.

Savacentre Ltd. has ordered 38 NCR 255 terminals, an NCR I-8200 and an NCR 726 minicomputer for the firm's hypermarket at Washington in County Durham, UK.

The UK's National Westminster Bank has ordered proof and encoding equipment valued at over $5 million from NCR Corp.

Armstrong Equipment Ltd. of Melton, Great Britain, a motor industry group, has ordered a Honeywell Model 66/05 computer valued at $1 million.

Matthews Group Ltd. of London, Ont., a construction and land development company, has installed a Honeywell Level 62 system valued at $183,800.

The European Space Agency has awarded contracts to Computer Technology Ltd. to supply a number of Model 8050 sytems with Camac interfaces for use in ground checkout stations for forthcoming satellite launches.

The Swiss Credit Bank in Zurich has ordered from Bunker Ramo GmbH its Bank Control System 90 terminals for more than 120 of the bank's branches in Switzerland. The total project is valued at over $5 million.

The Computer Communications Group of the Trans-Canada Telephone System has selected NCR Canada Ltd. to supply network interface machines for the Datapac network. The value of the contract exceeds $1 million.

Hanwa Co. Ltd., a Japanese steel distributor based in Osaka, has ordered a Univac 1100/11 system from Nippon Univac Kaisha, Ltd.

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Hennepin County (Minneapolis, Minnesota) is developing an integreted Human Services Information System to process food stemps, Titel IV-A (AFDC), Tital IV-D (Support and Collections), Tital XIX (Mediceid), Titel XX (Social Service), end state-local financiel and service programs.

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OMB Moves to Reform Contracting Procedures

By Molly Upton
CW Staff

WASHINGTON, D.C. – In another attempt to grapple with the thorny problem of determining when work should be contracted to outside firms and when it should be performed by government agencies, the Office of Management and Budget (OMB) has issued new guidelines.

The new proposal to OMB Circular A-76 states OMB's preference for retaining ongoing work within the government while encouraging new work to be contracted outside.

Acting Director James T. McIntyre Jr. emphasized that the proposal is subject to change and added that OMB received over 100 formal comments in preparing the package.

The circular states the federal agencies may generate a product or service only when this can be justified in the national interest. Grounds include "necessity for military readiness, lack of a suitable commercial source or finding that commercial performance would be costlier or that the function should be performed by government employees."

To justify the conversion of an ongoing in-house activity to outside performance, the cost of using a contractor must be less than the government cost by at least 10% of federal personnel costs," the proposal stated.

"This recognizes a potential loss of production, decrease in efficiency and unpredictable risks that go with such a conversion," OMB stated.

But in order to encourage agencies to contract out new projects, "the government's costs would have to be lower by at least 10% of personnel costs and 25% of material and facility costs to justify starting a new commercial or industrial activity."

This clause also recognizes the "risks of duplication, waste and obsolescence when the government invests in a new plant and facilities," OMB stated.

McIntyre clarified new work as that with no federal workers' jobs at stake.

Furthermore, "all comparative costs studies would use firm competitive bids for determining commercial costs. 'Ivory tower' estimates or informational quotations would be prohibited," the memo continued.

As a guideline for computing government costs of operations, the OMB proposed a formula for overhead of 24.4% of salary of federal employees, down from 28.7%, for the retirement cost factor and insurance costs.

Each agency would have to review its commercial activities every three years.

Other aspects of the proposal include requirements for more detailed criteria in seeking exceptions.

A public disclosure will be required for all documents and calculations performed by the government in order to promote a policy of openness.

A government group is developing a common, government-wide "handbook" of cost guidelines and factors to be used uniformly by all federal agencies. McIntyre stated this effort will move the government in the direction of full costing.

The OMB is also proposing a package of personnel policies which includes a clause that would give government employees rights of first refusal for contract jobs in cases where their activities are converted.

Each agency should have an independent review board that may hear appeals of decisions involving in-house vs. contracting out, the proposal indicated.

AJ and Vadic Cross Licenses

SUNNYVALE, Calif. – Anderson Jacobson, Inc. (AJ), maker of acoustic couplers, and Vadic Corp., maker of modems, have signed a cross-license agreement that observers expect will result in an acoustic coupler version of the Vadic VA3400, which operates on a full-duplex, two-wire line.

Under the agreement, AJ received an exclusive license to market acoustic couplers and a nonexclusive license to offer selected modems compatible with the VA3400.

Vadic was granted a nonexclusive license to market an acoustically coupled version of the VA3400 based on technology to be supplied by AJ.

Supershorts

Computer Communications, Inc. has finalized an increased credit line with Wells Fargo Bank which boosts the credit available from $1.8 million to $3.8 million.

Agile Corp. has been established as a subsidiary of the Dataflux Corp. to service the Gen-Com Systems, Inc. line of daisy printer terminals. Gen-Com went bankrupt.

The Data Products Group of Lear Siegler, Inc. has completed an agreement with Control y Proceso Electronico S.A. under which the Mexico City-based firm will produce Lear Siegler CRT terminals.

Tab Products Co. has increased the number of shares outstanding from 1.2 million to 5 million and approved a 3-for-2 stock split.

Can off-the-rack softwear fit you like a glove?

A special report on *Applications Packages* in the January 30th *Computerworld.*

When the applications program you write yourself costs five times as much as a package you can buy off the shelf, "canned" software has a lot of appeal. Off the shelf software has become more attractive for vendors, too. Many small system manufacturers, for example, have found that applications software sales can add 15% or 25% to their hardware revenues. And more companies than ever before are entering the market with new software products for a wider range of applications — with ever greater modularity.

We'll be taking a close look at the subject in our January 30th special report, titled *Applications Packages*. Edited by Don Leavitt, this report will summarize the latest information available — including products, vendor strategy and market activity. In problem/solution format, the report will feature user experiences in the evaluation, selection, installation and use of applications packages, as well as topics like these.

- Converting programs and files from one hardware or operating system to another — examining the effort required.
- A statistical evaluation of commercial software — survey analysis.
- A review of vendor support for training and installation, and for installed packages affected by government regulations.
- Applications options offered to users through remote computing services.
- An overview of the industry — how vendors are expanding into new applications areas; adapting current lines to different CPU's; or consolidating product line to concentrate in selected areas of expertise.

If you're an MIS executive, DP Manager, Supervisor or Lead Programmer, our January 30th special report should be on your reading list. If you market programming products or services, you should put this report on your ad calendar. Ad closing date is January 13. Your *Computerworld* salesman can give you complete details. Or reserve your ad space today with a call to Terry Williams at (617) 965-5800.

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This position requires 2 years experience in a manufacturing environment with special emphasis on mini-computer applications in manufacturing and engineering. We prefer a college degree and knowledge of PDP 11 series (11/60 would be ideal), RSX-11M operating systems, FORTRAN IV and/or DEC BASIC. Responsibilities will be broad-based, including systems analysis, programming, scheduling and general administration and management.

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Prefer a minimum of 2 years experience with IBM equipment and a knowledge of COBOL and FORTRAN.

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- Analog
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System Engineers

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System analysts to work with system engineers in trade-off analysis to support system concept and definition.

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Requires MS or PhD in EE or CS and 5 years' experience in hardware and software design of real-time computer systems.

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The Tennessee Valley Authority's continued growth has created a need for an experienced Technical Writar at Chettanoga, Tennessee, to write, orgenize, and edit technical and operational ADP information for publication to TVA's computer users. Publications include an ADP Standards Manual, a monthly newsletter, special user guides, impromptu announcements, and instructional bulletins. The selected epplicant will provide instruction on use of TVA's ADP facilities through personal contact, telephone, and publications and will be responsible for the maintenance of TVA's ADP vendor manual inventory and distribution of manuals to users.

Candidate should have a bachelor's degree or its equivalent in training and experience in computer science, mathemetics, or e related discipline, plus at least three years of recent progressive experience in the use of ADP systems. Demonstrated ability and interest in assimilation of and preparation for publication of technical data is required.

Salary to $18,000. Excellent fringe benefits.

Send resume in confidence to Employment Branch CW-76, Room 232 MIB.

TVA may consider for eppointments only U.S. citizens and others eligible for payments under section 602, Pub. L. 94-363, and section 750, Pub. L. 94-419.

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Programmers, life can be beautiful!

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Data Processing Careers, Inc
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Qualified applicants should forward a resume, complete with salary history, in confidence to Jim Stewart at Data General Corp., 15 Turnpike Rd., Westboro, MA 01581. Or call Jim directly between the hours of 9 am and 6 pm, Mon.-Fri., at (800) 225-7347, ext. 3065. (in Massachusetts call (617) 366-8911, ext. 3065)

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Interested parties should rush a detailed resume, including salary history to: Henry Oliver, Manager of Field Employment, University Computing Company, P.O. Box 47911, Dallas, TX 75247. All replies will be treated in strict confidence.

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XEROX

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APPLICANTS must have a degree in Computer Science or related field and must have demonstrated fluency in S/370 assembler language and a sound knowledge of operating system organization and principles. Also desirable are experience with HASP or JES2 internals, experience with interactive systems, and advanced degree. Salary and responsibilities will be commensurate with education and experience. Send resumé, including education, professional experience, and salary history, to Dr. Donald T. Laird, Director, Computation Center, 229 Computer Bldg., University Park, PA 16802.

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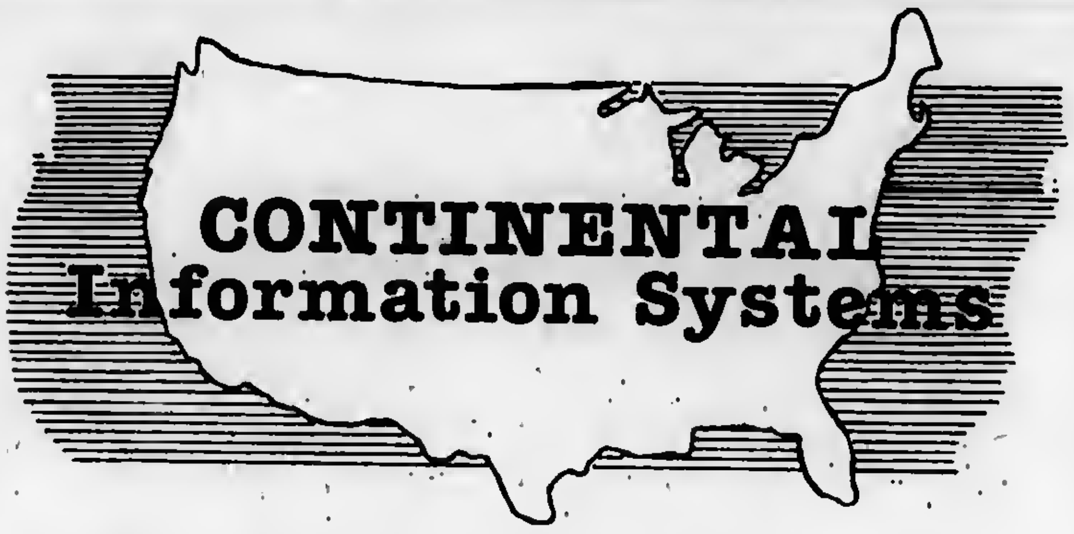

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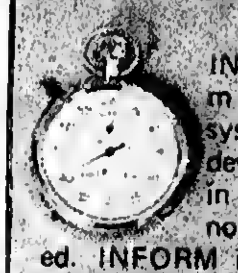

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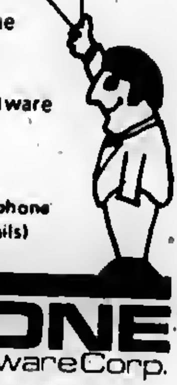

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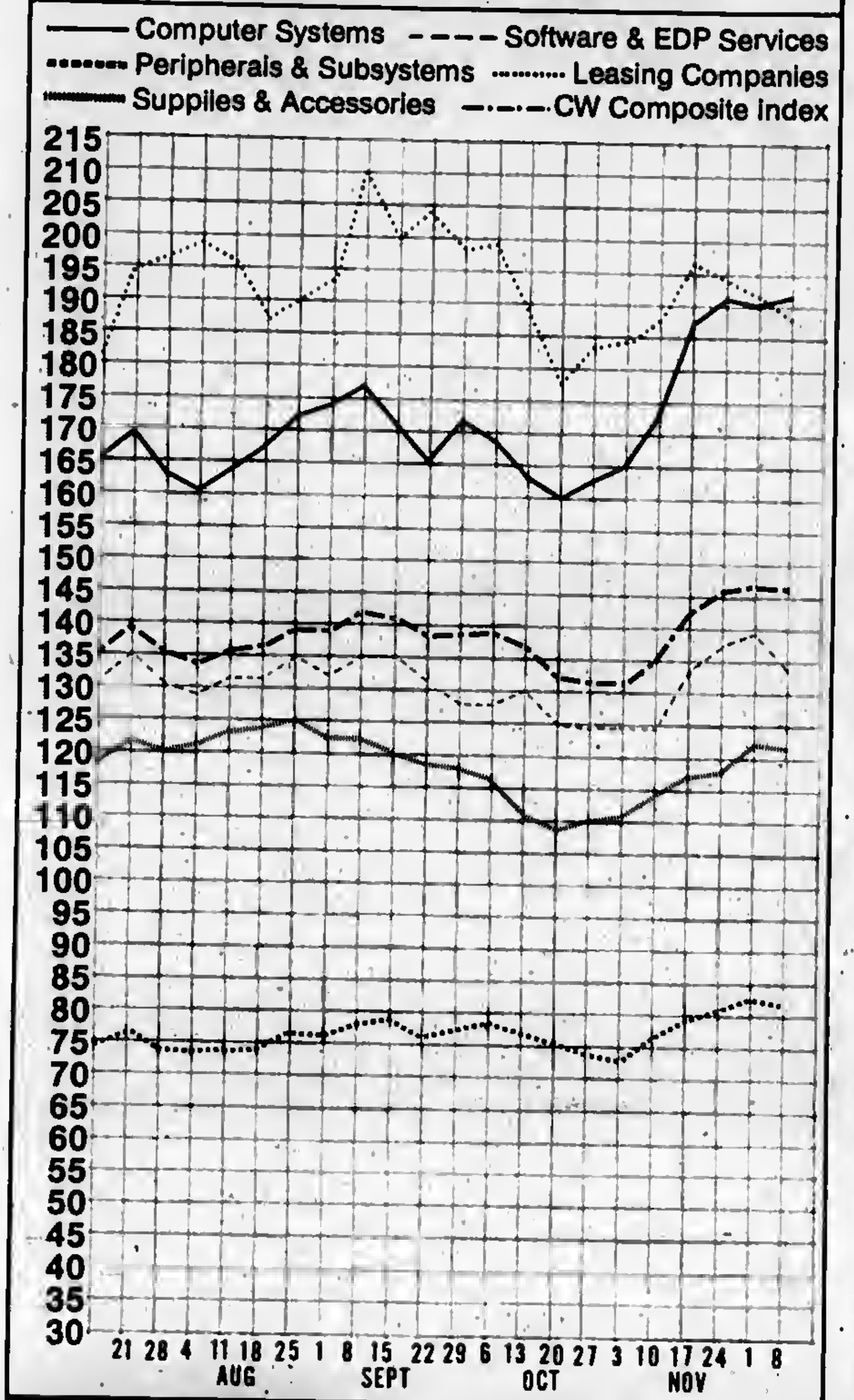

Earnings Reports

ANDERSON JACOBSON
Three Months Ended Sept.30

	1977	1976
Shr Ernd	$.15	$.11
Revenue	7,032,00	5,256,000
Earnings	330,000	282,000
6 Mo Shr	.28	.21
Revenue	13,078,000	0,997,000
Earnings	831,000	496,000

AMPEX
Three Months Ended Oct. 28

	1977	1976
Shr Ernd	$.47	$.26
Revenue	80,588,000	73,836,000
Tax Cred	1,980,000	824,000
Earnings	5,100,000	2,833,000
6 Mo Shr	.88	.43
Revenue	151,372,000	139,285,000
Tax Cred	3,878,000	1,500,000
Earnings	9,822,000	4,645,000

CAMBRIDGE MEMORIES
Year Ended August 31

	1977	1976
Shr Ernd	$2.42	.....
Revenue	7,214,000	$18,412,000
Tax Cred	438,000	.....
Spec Cred	e3,320,000	b(3,377,000)
Earnings	4,230,000	(12,808,000)
3 Mo Shr	.11	.....
Revenue	1,811,000	2,058,000
Tax Cred	88,000	.....
Spec Cred	.....	b(3,377,000)
Earnings	208,000	(10,123,000)

e-Gain on extinguishment of certain indebtedness. b-Includes provisions of $1,269,000 for loss on disposition of European subsidiaries, $1,100,000 for loss upon closing a semiconductor operation and $1,008,000 for termination and revision of facility leases.

COMPUGRAPHIC
Year Ended Oct.1

	1977	1976
Shr Ernd	$4.17	$3.85
Revenue	129,945,000	85,270,000
Earnings	9,608,000	7,504,000
3 Mo Shr	1.08	.86
Revenue	34,820,000	24,790,000
Earnings	2,475,000	2,015,000

LEAR SIEGLER
Three Months Ended Sept.30

	e1977	1976
Shr Ernd	$.53	$.37
Revenue	263,882,000	171,474,000
Earnings	8,822,000	8,081,000

e-Includes results of Royal Industries, Inc., acquired in January 1977.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 7, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE 111	CLOSE DEC 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 48	45 1/2	+1	+2.2
N	BURROUGHS CORP	55- 91	67 1/2	-1 3/4	-2.5
O	COMPUTER AUTOMATION	18- 30	26 1/8	-1 1/4	-4.5
N	CONTROL DATA CORP	20- 27	25	- 1/2	-1.9
O	CRAY RESEARCH INC	15- 29	26 1/4	- 3/4	-2.7
N	DATA GENERAL CORP	35- 54	47 7/8	-2 3/8	-4.7
N	DATAPOINT CORP	18- 41	39	+1 3/8	+3.6
N	DIGITAL EQUIPMENT	37- 53	44 7/8	-2 1/4	-4.7
N	ELECTRONIC ASSOC.	2- 3	2 3/4	+ 1/4	+10.0
A	ELECTRONIC ENGINEER.	8- 12	12 1/8	+1 1/4	+11.4
O	FOUR-PHASE SYSTEMS	13- 21	19 3/4	+ 1/4	+1.2
N	FOXBORO	41- 54	48 3/8	- 1/8	-0.2
O	GENERAL AUTOMATION	6- 9	6 3/4	- 1/2	-6.8
O	GRI COMPUTER CORP	1- 1	3/4	0	0.0
N	HEWLETT-PACKARD CO	69- 87	71	-1 7/8	-2.5
N	HONEYWELL INC	43- 55	45 1/8	-1 3/4	-3.7
N	IBM	245-286	261	-3	-1.1
O	MANAGEMENT ASSIST	5- 10	9 1/2	+ 5/8	+7.0
O	MICRODATA CORP	7- 18	11 7/8	- 3/8	-3.0
O	MODULAR COMPUTER SYS	5- 9	9 1/4	+ 7/8	+10.4
N	NCR	32- 47	39 5/8	-1 1/8	-2.7
O	PRIME COMPUTER INC	12- 23	21 3/4	- 5/8	-2.7
N	PERKIN-ELMER	17- 22	20 1/4	-1 1/8	-5.2
N	RAYTHEON CO	16- 35	32	-1 5/8	-4.8
N	SPERRY RAND	30- 42	32 7/8	-1 7/8	-5.3
O	SYCOR INC	8- 20	19 3/4	+6 1/8	+44.9
A	SYSTEMS ENG. LABS	5- 11	10 1/4	+ 5/8	+6.4
A	WANG LABS.	10- 14	12 1/2	- 3/8	-2.9

LEASING COMPANIES

EXCH		PRICE 1977 RANGE 111	CLOSE DEC 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 5/8	+ 1/8	+2.7
O	BOOTHE COURIER CORP	8- 10	12 7/8	+ 3/8	+3.0
O	COMDISCO INC	10- 14	13 1/2	+1	+8.0
A	COMMERCE GROUP CORP	1- 3	5/8	- 1/8	-16.6
A	COMPUTER INVSTRS GRP	1- 2	3/4	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	+ 1/8	+12.5
A	DCL INC	1- 3	2 1/4	- 1/8	-5.2
N	DPF INC	6- 10	8 7/8	- 3/8	-4.0
N	ITEL	13- 22	19 1/4	- 3/8	-1.9
N	LEASCO CORP	19- 27	24 1/4	- 1/2	-2.0
O	LEASPAC CORP	1- 2	3/4	- 1/8	-14.2
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/8	- 3/8	-6.5
N	U.S. LEASING	10- 16	14 1/2	- 1/4	-1.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE 111	CLOSE DEC 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	9	0	0.0
A	APPLIED DATA RES.	5- 10	8 1/4	- 1/2	-5.7
N	AUTOMATIC DATA PROC	23- 30	28 3/8	+ 1/8	+0.4
O	COLEMAN AMERICAN COS	2- 2	1 3/4	- 1/8	-6.6
O	COMPU-SERV NETWORK	9- 15	11 1/4	- 3/4	-6.2
O	COMP ELECTION SYSTMS	6- 10	9 1/2	+ 1/2	+5.5
O	COMPUTER HORIZONS	1- 1	1	- 1/4	-20.0
O	COMPUTER NETWORK	6- 11	9 5/8	- 1/4	-2.5
N	COMPUTER SCIENCES	7- 9	8 7/8	+ 1/8	+1.4
O	COMPUTER TASK GROUP	1- 2	1 5/8	- 1/4	-13.3
O	COMPUTER USAGE	1- 3	1 1/2	- 3/4	-33.3
O	COMSHARE	5- 8	7 1/2	- 1/4	-3.2
O	DATA DIMENSIONS INC	3- 5	3 3/4	0	0.0
O	DATATAB	1- 2	1 1/4	- 1/8	-9.0
N	ELECTRONIC DATA SYS.	14- 20	15 5/8	- 5/8	-3.8
O	INSYTE CORP	2- 3	1 1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	+ 1/8	+3.3
O	KEYDATA CORP	1- 3	1 1/4	- 1/8	-9.0
A	LOGICON	7- 17	14 5/8	+1 3/8	+10.3
A	MANAGEMENT DATA	1- 2	1	0	0.0
A	NATIONAL CSS INC	10- 16	15	- 7/8	-5.5
O	NATIONAL DATA CORP	4- 7	6 7/8	- 1/8	-1.7
A	ON LINE SYSTEMS INC	16- 22	18 3/4	- 1/2	-2.5
N	PLANNING RESEARCH	3- 6	4 3/4	- 1/4	-5.0
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 3/4	0	0.0
O	REYNOLDS & REYNOLD	17- 21	19 1/2	- 1/2	-2.5
O	SCIENTIFIC COMPUTERS	1- 4	4	0	0.0
O	TYMSHARE INC	14- 23	21	- 1/4	-1.1
A	URS SYSTEMS	4- 5	4 1/4	- 5/8	-12.8
N	WYLY CORP	1- 2	1	+ 1/8	+14.2

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE 111	CLOSE DEC 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 16	14 3/8	- 5/8	-4.1
O	ADVANCED MEMORY SYS	7- 9	7 5/8	- 5/8	-7.5
N	AMPEX CORP	8- 11	9 1/4	- 1/4	-2.6
O	ANDERSON JACOBSON	3- 5	4 5/8	0	0.0
N	APPLIED DIG DATA SYS	10- 20	13 1/8	- 3/4	-5.4
O	BEEHIVE INT'L	5- 12	5 1/2	- 1/8	-2.2
A	BOLT,BERANEK & NEW	7- 9	7 3/8	- 1/8	-1.6
N	BUNKER-RAMO	8- 13	11 1/2	-1	-8.0
A	CALCOMP	3- 5	2 7/8	- 1/8	-4.1
O	CAMBRIDGE MEMORIES	1- 4	3 3/8	+ 3/8	+14.5
N	CENTRONICS DATA COMP	20- 30	19 3/4	- 3/4	-3.6
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	5- 8	7 1/4	- 1/4	-3.3
O	COMPUTER CONSOLES	4- 7	3 3/4	- 1/4	-6.2
A	COMPUTER EQUIPMENT	2- 3	3	+ 1/8	+4.3
O	COMPUTER TRANSCEIVER	1- 1	7/8	- 1/4	-22.2
O	COMTEN	9- 13	10 7/8	- 1/8	-1.1
N	CONRAC CORP	19- 28	22 1/2	-1 1/2	-6.2
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 11	10	- 1/2	-4.7
A	DATA PRODUCTS CORP	9- 19	17	- 7/8	-4.8
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 7/8	- 1/8	-6.2
O	DECISION DATA COMPUT	2- 3	2	+ 1/8	+6.6
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 11	10 1/8	+ 1/8	+1.2
O	DATARAM CORP	2- 24	22	+2	+10.0
N	ELECTRONIC M & M	4- 5	4 1/4	+ 1/8	+3.0
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 3/4	+ 1/8	+7.6
N	HAZELTINE CORP	8- 12	10 3/4	+ 7/8	+8.8
N	HARRIS CORP	28- 44	41 1/2	+ 3/8	+0.9
A	INCOTERM CORP	10- 19	17 5/8	- 3/4	-4.0
O	INFOREX INC	4- 7	6 3/8	0	0.0
O	INFORMATION INTL INC	9- 14	9	- 1/2	-5.2
O	INTEL CORP	38- 57	44	-1 1/2	-3.2
A	LUNDY ELECTRONICS	3- 6	3 7/8	+ 1/8	+3.3
O	MSI DATA CORP	6- 14	13 5/8	- 1/2	-3.5
O	MEMOREX	23- 34	29 5/8	- 5/8	-2.0
N	MOHAWK DATA SCI	5- 8	6 1/8	+ 1/8	+2.0
O	PENRIL CORP	2- 5	5 5/8	+ 3/8	+7.1
N	PERTEC CORP	7- 11	10 3/8	- 1/8	-1.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	+ 1/2	+33.3
O	QUANTOR CORP	3- 5	3 1/8	0	0.0
O	RECOGNITION EQUIP	6- 10	7	0	0.0
O	SCAN DATA	1- 2	7/8	- 1/8	-17.6
O	STORAGE TECHNOLOGY	10- 20	18 7/8	-1	-5.0
O	T BAR INC	7- 13	12 3/4	- 1/4	-1.9
O	TALLY CORP.	4- 6	4 1/4	0	0.0
A	TEC INC	7- 10	7	- 1/4	-3.4
N	TEKTRONIX INC	29- 40	36 5/8	- 5/8	-1.6
N	TELEX	2- 3	3	+ 1/4	+9.0
O	WILTEK INC	1- 1	3/4	+ 1/8	+20.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE 111	CLOSE DEC 7 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 7/8	+ 1/8	+1.8
O	BALTIMORE BUS FORMS	1- 4	1 3/4	0	0.0
A	BARRY WRIGHT	10- 15	14 1/2	- 1/8	-0.8
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	18 1/2	- 1/2	-2.6
N	ENNIS BUS. FORMS	6- 7	6 5/8	- 1/8	-1.8
O	GRAPHIC CONTROLS	13- 18	16	+ 1/2	+3.2
N	3M COMPANY	46- 56	46 1/2	-1 7/8	-3.8
O	MOORE CORP LTD	24- 37	27 1/2	+ 1/2	+1.8
N	NASHUA CORP	16- 28	19 1/2	+ 3/4	+4.0
O	STANDARD REGISTER	18- 25	22	- 3/4	-3.2
O	TAB PRODUCTS CO	10- 19	10	0	0.0
N	UARCO	18- 22	20 1/4	+ 1/8	+0.6
A	WABASH MAGNETICS	10- 15	12 3/8	- 5/8	-4.8
N	WALLACE BUS.FORMS	17- 21	20 3/8	+ 1/8	+0.6

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NEWSPAPER

Season's Greetings

Computerworld

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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FBI Accused of Hiding NCIC Software Flaws

By Edith Holmes
CW Staff

WASHINGTON, D.C. – The National Crime Information Center's (NCIC) computer operating system does not meet the requirements of the Privacy Act of 1974, and sources within the Federal Bureau of Investigation (FBI) have claimed the bureau has tried to conceal this information from Congress.

FBI officials contacted about the accusation last week said the organization was aware of the privacy prohlems inherent in its use of IBM's OS/MVT environment, but denied it has attempted to keep this information from the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, which is responsihle for overseeing hureau operations.

The subcommittee, chaired by Rep. Don Edwards (D-Calif.), was not aware that OS/MVT cannot prevent unauthorized reading of the files it governs, a staff member said, adding that the committee will look into the matter.

NCIC operates OS/MVT on an IBM 360/65, an environment ruled earlier this year by the U.S. Comptroller General to be insufficient to meet Privacy Act restrictions [CW, May 30].

Twelve years old and an outgrowth of IBM's OS/360 program, the operating system was created before the confidentiality of individuals' records had gained much attention in the U.S.

The operating system deficiencies do not permit federal agencies to comply with the Privacy Act of 1974 which calls for them "to establish administrative, technical and physical safeguards to ensure the security and confidentiality of records and to protect against any anticipated threats or hazards to their security or integrity."

In light of these problems, the Comptroller General has ruled against the system twice in the last three years, denying proposals to use OS/MVT as the basis for a time-sharing system to keep U.S. Navy personnel records and for a dedicated DP service for the Federal Energy Administration through a facilities management contract [CW, May 30].

Familiar with the publicity OS/MVT's poor privacy record has received, the FBI "has some concern about it," according to Charles Neudorfer, section chief of NCIC's Technical Services Division. "We are constantly looking at

(Continued on Page 6)

Neglected Consumer Opinion

Banks Mishandled EFT: Peterson

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. – Electronic funds transfer (EFT) has gained only modest public acceptance thus far because bankers neglected to sample consumer opinion before they began implementing the concept, according to Esther Peterson, President Carter's special assistant for consumer affairs.

Like the proponents of some other recent technological innovations, bankers assumed in advance that their customers would immediately take automated banking systems to heart, Peterson said here during a recent seminar on the consumer implications of EFT.

But the financial community apparently overestimated consumer interest in EFT, and many formerly promising automated banking projects soon foundered as a result, she recalled.

Bankers can still salvage EFT, hut not without soliciting consumer advice in planning and implementing the concept. Only if bankers consult consumers and consumer leaders ahout the potential prohlems of automated hanking systems will they he able to end the red ink and bad press that thus far has hampered EFT's progress, Peterson advised.

In an address at the seminar, which was sponsored by Virginia Polytechnic Institute and State University and by the Virginia Citizens Consumer Foundation, Peterson noted parallels between the current EFT flap and the con-

(Continued on Page 4)

Thirty-Two Packages Earn Datapro Software Honors

By Don Leavitt
CW Staff

DELRAN, N.J.– Thirty-two packages earned places on the 1977 Software Honor Roll and a dozen of them "deserve special recognition" since they satisfied the requirements for the honor roll for the third consecutive year, according to Datapro Research Corp.

The honor roll is made up of those packages that received weighted average ratings of 3.5 or higher in overall satisfaction and 2.8 on various specific attributes, from 10 or more users in a nationwide survey conducted hy Datapro.

The requirement of at least 10 ratings is a tightening of the standards set previously when six or more other qualified ratings could put a product on the honor roll, Datapro said.

The three-time winners include Alltax, a tax calculation package from Management Science America; Asap, a spooler from Universal Soft-

(Continued on Page 6)

Univac Halts Development Of Uniform Product Line

By E. Drake Lundell Jr.
CW Staff

BLUE BELL, Pa. – Univac has dropped its plan to develop a new family of processors capahle of running programs from both the word-oriented 1100 series and the byte-oriented 90 series processors, company officials said last week.

The firm has stopped work on Project Roanoke, which would have led to a uniform product line in late 1979 or early 1980, in favor of a more evolutionary approach because of "increasing user resistance to change."

While the firm still has a uniform product line as its goal for sometime after the early 1980s, it will concentrate on converging the user interfaces to the firm's software over the short term, according to Dr. Nicholas DiCianni, director of strategic planning

The idea of a uniform product line as announced hy the firm in 1973 included a series

(Continued on Page 2)

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For Specialized Programs

CDC to Offer Usage Price Option

By Don Leavitt
CW Staff

MINNEAPOLIS — Control Data Corp. has announced a pricing plan for specialized application programs, a plan broadly similar to approaches tried, with limited success, by several independent software houses five years ago.

CDC's "usage pricing" plan generally requires a small initial fee plus a small monthly fee. It also provides for additional charges above the minimum, based on the installation's actual usage, a spokesman explained.

The plan is most appropriate for application packages that are used sparingly, but which are extremely important when they are needed.

As implemented in Apex III, an advanced mathematical programming package — and the first CDC software to have the usage pricing option, the plan allows an installation to set a usage threshold which when passed either causes the system to print a warning message or prevent further use of the package.

The number of "usage units" charged for each of the facilities within Apex III varies with the complexity of the facility. Totals are accumulated in an accounting file which is accessed by a reporting routine once a month.

The user is supposed to send the accounting information to CDC, which prepares a bill. If the installation feels the bill is high and indicative of continuing high usage, it has the option of scrapping the month-by-month usage pricing agreement and replacing it with a fixed-cost 12-month lease. The lease can be made 30-days retroactive to wash out the pending monthly use bill, the spokesman added.

Similar Plans

Applied Data Research, Inc. (ADR) offered a similar "metered approach" for the use of its Autoflow package in 1971, counting and charging for the number of source lines processed. "About 30 or 40" installations asked for the metering but ADR had problems getting some of them to actuate the billing routine, an ADR spokesman said.

Without that kind of cooperation, the plan was doomed to failure and it was withdrawn several years ago, he acknowledged.

About six years ago, Bonner & Moore Associates offered a "usage agreement" for its financial planning package FP/70, but it was accepted by only one installation and has been dropped, according to a source at the company headquarters in Houston.

"Usage pricing" is conceptually similar to the billing approach used by most remote-computing services in which the user is charged only for the computer resources required for his work and the amount of time they were used.

Univac Halts Product Plan

(Continued from Page 1)

of central processors capable of emulating the firm's disparate 1100 and 90 series as well as the Spectra 70 series the firm acquired when it took over the RCA user base.

However, the firm once supported more than a dozen operating systems and has pared that number down to three — OS/3, OS 1100 and VS-9 — over the past four years, DiCianni said.

In addition, he noted that OS/3 and VS-9 already share common user interfaces to their compilers and data base management systems.

Nontransparent Conversion

Development on the Roanoke project had progressed far enough for the firm to realize, however, that conversion to the new processors would not be completely transparent to users, he indicated.

The line would have been capable of emulating all three of the present operating systems, he said, but users would have had to convert their applications to the new system to be able to take full advantage of its capabilities.

Because of this, Univac would have been left supporting four operating systems — the present three plus the new addition — rather than only one as had originally been envisioned, he said, therefore negating the reason for the uniform line in the first place.

In addition, users are reluctant to go through the process of converting their applications, he noted, and probably would have resisted going to the new line for that reason.

Instead, Univac will concentrate on developing a commonality of user interfaces in the various operating systems it now supports, at least for the near term, he said.

People Reassigned

Many of the developments that came about as a result of the Roanoke work will be used in this process, he said, noting that the 600 people involved in the project were being reassigned within the company.

Particular areas where this convergence of user interfaces will be seen include data base and data communications software as well as higher level languages, he said.

However, he noted that the 1100 series is Ascii-based while the 90 series is Ebcdic, which will present problems in developing interface commonality.

Telecon Spans Lines

In the data communications area, the firm's Telecon software presently spans the two lines and the DCP front end is also used on both 90 and 1100 systems. In addition, Univac's Distributed Communications Architecture is used by both, he pointed out.

In the future, Dicianni said users can look for Univac to make its higher level languages more compatible.

Today it is impossible to run either Cobol or Fortran developed for one system on the other, but Univac is working on ways to make them both more portable.

On the Inside This Week

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11:59:59

Before the ball drops on 1977, our thanks to 1,614 users for giving SyncSort 50% of its market!

If you're in the other half, call (201) 568-9700.

Why start 1978 with a sorting hangover?

SCENE: One of those prestigious industry seminars that took place just a few years ago. The very cream of the data-processing world was in attendance. All the women were brilliant and all the men were handsome.

During a pause for refreshment, an affable hardware executive stopped to exchange a few words with Our Man on the Scene.

"SyncSort?" he said. "Sorting program, isn't it? Well, lots of luck. But you'll have to remember that sorting has traditionally been the hardware manufacturer's turf."

Our man didn't say a word. He just favored the hardware merchant with a cheshire-cat smile and thought to himself: Wait, friend, wait!

* * *

We're happy to announce that the wait is now over. On December 1, the sorting turf changed hands. SyncSort became the most widely used OS and OS/VS sort in the U.S., with 1,614 tough-minded, clear-eyed users — or half the total. (To whom, incidentally, we send our warmest holiday greetings!)

The tables below will give you a somewhat clearer picture of IBM's Decline and Fall as a Sorting Power. The figures on the left show the results of a telephone survey of OS and OS/VS users in America conducted for us last July by the International Data Corporation. (We'll be glad to send you a copy if you'll call.)

The figures on the right are an updated projection to December 1, made by our beloved House Statistician, a fussy old character in a green eye shade, formerly employed by Scrooge & Marley.

OS & OS/VS Sort Users — U.S. Only

	July 1, 1977		December 1, 1977	
	#	%	#	%
SyncSort	1333	43	1614	50
5740-SM1	992	32	880	28
5734-SM1	465	15	395	12
SM023	186	6	182	6
Others	124	4	129	4
	3100		3200	

As the math majors among you will have concluded, IBM's three sorts — one of which is a "freebie" — now have only 46% of a market that once belonged to them lock, stock and barrel. A very bad case of erosion, as our dentist would say.

And as for the other sorts, well, they're still holding on to their share of the market with what's left of the old fingernails.

There are probably a number of reasons for SyncSort's accelerating success in 1977. But if you had to isolate the three most important, you'd have to say performance, performance and performance. If a sort program doesn't save your computer resources and make your life a little more pleasant, what does it do? Boil eggs?

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EFT and Cash, Consumers Want Choice: Prins

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — Consumers should be given the opportunity to reject electronic funds transfer (EFT) systems if they so choose, according to Curtis A. Prins, staff director of the House Banking, Finance and Urban Affairs Subcommittee on Consumer Affairs.

Speaking here during a recent seminar on the consumer implications of EFT, Prins predicted that if consumers abdicate their right to choose, EFT will be forced upon them by financial institutions and other special interests.

"The financial industry is not going to spend millions and millions of dollars on EFT and then leave it to your choice," the staff director told consumer, industry and government representatives.

Security Guidelmes

During and address at the two-day seminar, which was sponsored jointly by Virginia Polytechnic Institute and State University and by the Virginia Citizens Consumer Foundation, Prins also argued that consumers should demand a voice in creating EFT security guidelines. If consumers fail to protect their EFT security interests, no one else will, and their bank accounts could easily fall victim to fraud, he cautioned.

Elaborating on the security question, Prins also voiced his opposition to a proposal that would totally exempt financial institutions from liability for fraud in cases of clear customer negligence of carelessness.

To illustrate the dangers of giving carte balance to the financial community's EFT development plans, Prins urged his seminar audience to recall the recent history of credit card use in the U.S.

When the first credit cards appeared 15 years ago, backers promised monthly receipts and no finance charge if the holders paid their bills within 25 days. Now, however, the rules of the credit card game have changed. "No more 25-day grace period; and you've got to be charged for the card," Prins said.

Today, EFT proponents are promising the same benefits that were previously ascribed to credit cards, and unless some restrictions are demanded, EFTers will renege on their promises just as the credit card advocates did years ago, he warned.

When a customer walks into a store, the proprietor will someday be able to say, "You can pay any way you want to as long as it's with an EFT card."

Continuing with his analogy, Prins noted that credit cards have become a nearly indispensable part of American financial life. "You've got to have a credit card to operate in today's economy," he said. "If you don't, you are a third-class citizen."

Unless consumer groups and their sympathizers act promptly, EFT will soon occupy the same position of importance in Western economies that credit cards occupy today. This widespread acceptance will create almost irresistible pressures that will foce even EFT opponents to own and use EFT cards and systems, Prins predicted.

When a customer walks into a store, the proprietor will someday be able to say, "You can pay anyway you want to as long as it's with an EFT card," he said.

Efforts to restrain the activities of EFT planners must come from consumers and other groups outside the financial community, he added. Customers should not expect banks and other similar institutions to guard consumer interests as dutifully as they would their own.

Prins accused some members of the financial community of engaging in a kind of developmental blitzkrieg in which they hope to rush large numbers of EFT systems onto the market before consumers have a chance to react and impose effective constraints on EFT operations. After the systems become well established in the banking world, the financial community will tell consumers in effect, "Well, look, EFT is already here; it's too late to do anything about it," Prins said.

Consumers, however, apparently do not share the financial community's enthusiasm for EFT. "I've traveled all over this country, and I've never talked to one customer who wants EFT," Prins reported. "If it's true, as we've been told, that EFT is the greatest thing since Monday night football, why aren't consumers knocking the doors down to get at EFT?"

Some sectors of the banking industry have also voiced misgivings about EFT but will probably yield to the concept eventually because of competitive pressures. "Small bankers all around the country don't want EFT, but they are afraid they will be forced into the system solely because the bank across the street is going to get it, or the Chase Manhattan or the Citibank or the Bank of America," he contended.

Peterson Says Banks Rushed Move to EFT

(Continued from Page 1)

troversy a few years ago involving the Universal Product Code (UPC).

Like today's banking community, UPC backers proceeded with their development plans without soliciting consumer input. Like the bankers, they assumed they already knew their customers' service needs thoroughly, and they boasted of all the consumer benefits their technological darling would produce — lower food costs, reduced checkout times, fewer checkout errors, detailed sales receipts and decreased labor costs, Peterson said.

But despite these claimed advantages, supermarket scanning equipment, like EFT, soon encountered unexpectedly stiff customer opposition. Consumers complained about the possibility of fewer checkout lanes, about potential disparities between prices on the shelves and in the computer and, most of all, about plans to end price-marking of individual items, Peterson observed.

In the end, lack of consumer involvement in system planning and development doomed UPC-based supermarket checkout equipment to almost complete failure, and much the same fate has befallen EFT, the consumer adviser contended. Automated banking projects that began with much fanfare only a few years ago have long since been abandoned by their promoters.

Chase Manhattan Bank, for example, removed a string of automated teller terminals in New York City's Grand Central Station because of customer indifference. Lack of use also forced Glendale Federal in California to close a supermarket EFT system, and in Chicago a joint EFT project involving Bell Federal Savings and a food processing chain recently folded for the same reason.

Peterson attributed EFT's poor reception to various consumer misgivings. Some customers have rejected automated banking systems because they never learned how to operate the equipment.

Others feared EFT might lessen their control over their personal finances, she speculated. They doubted that a machine could deposit their paychecks and pay their bills without errors, and they questioned how they would verify payments under such a system.

Still other consumer objections have raised disturbing questions about possible privacy and security risks posed by EFT systems and about the extent of customer liability for theft or fraud in personal bank accounts, she said.

Whatever the source of consumer gripes, EFT's failure "has hit bankers where it hurts the most — in the pocketbook," she explained. On the other hand, she added, the financial community also has probably learned a valuable lesson from its experiences with EFT.

"Maybe it takes a good solid kick in the pocketbook to make people realize that consumers' reactions to automation aren't always easy to gauge, even through marketing studies," she said.

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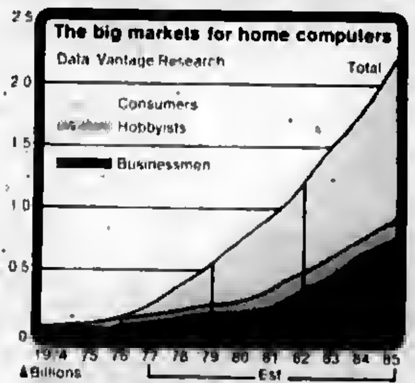

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Privacy Debate Set Abroad

Special to CW

LUXEMBOURG — The parliament here will soon begin consideration of a government-proposed privacy law that contains many of the features common to such laws in other European countries.

The bill applies to information about individuals, is confined to automated systems, prohibits collection of certain sensitive information, requires the registration and authorization of data banks and allows access by data subjects to their files.

The bill calls for a consultative commission operating with the Ministry of Justice that would be responsible for granting requests for data banks in the private sector. Under the proposed law, government agencies would also be required to seek commission approval for new data banks, but here in the case of disputes, the final decision will rest with the Council of Ministers. Police records are not included.

Data banks located outside Luxembourg but remotely accessed in this country would also have to be operated according to the Luxembourg law. This is to avoid any possibility that holders of sensitive data could maintain their systems abroad but retrieve and use the data in Luxembourg, sources indicated.

Overregulation Hikes Prices

Go Easy On Laws Covering EFT, Banker Urges

By Nancy French
CW Staff

WASHINGTON, D.C. — Electronic funds transfer (EFT) systems can hold down costs to banks and improve services to customers much like direct dialing and automated switching did for telephone users, but those benefits can disappear in the face of overregulation by states and the federal government, Donald R. Hollis, a Chase Manhattan Bank vice-president, said here recently.

Speaking at a two-day conference sponsored jointly by the Virginia Citizens Consumer Foundation and Virginia Polytechnic Institute and State University, Hollis explained that many bank branches are unprofitable given today's cost trends. Further, it is unlikely that profitability will be restored with transaction costs rising rapidly as a result of inflation and with many branches that were opened primarily for consumer convenience being underutilized.

EFT is a way out of these difficulties, but like any change to a more efficient payment system, it involves complex trade-offs, he said.

Hollis compared the cost/benefit trade-offs of EFT with those of automotive air bags. In the latter case, he told his audience of consumer advocates, "forced governmental investment in the development of [air bags] has increased car prices to all consumers."

Invited to present the banking industry's view of EFT to conference attendees, Hollis pointed out that he agreed with many principles held by the Consumer Federation of America (CFA) with regard to EFT. However, he indicated there are two sides to every story.

In answer to CFA's argument that EFT increases the possibility of breaching the confidentiality of consumers' financial affairs, Hollis agreed that privacy was an important consideration but added privacy problems were not brought about by EFT alone.

Applying blanket data protection regulations to all banking data interferes with the type of personal data interchange that can help consumers establish new financial relationships easily when they relocate, he said, noting this is surely detrimental to the consumer.

As for CFA's belief that the same $50 maximum liability that applies to lost credit cards should be extended to the EFT debit card, Hollis balked. "It is our opinion that institutionalization of losses caused by careless consumers" who, for example, write their personal identification numbers (PIN) on their debit cards, "adds to the cost for the careful consumer," he said.

Consumers groups also have argued that banks should pass on to consumers the savings that result from conversion to EFT. Here, Hollis argued that such benefits would occur "as a result of competition" and take the form of "improved convenience and the avoidance of price increases."

Consumer Choice

Consumer groups have also argued against adoption of EFT to the extent that the customer may no longer have the choice of using cash and checks — both systems that provide receipts. On this point, Hollis agreed that choices were a concern to everyone and consumer suggestions would be "quite helpful." But, he argued, financial institutions should not be in the position of adopting a system developed by legislatures which have no expertise in such problems.

In the area of sharing terminals and thus keeping costs down for banks, retailers and ultimately consumers, Hollis said, "The standard I foresee is one of negotiated access, including negotiated transaction interchange fees, which will encourage system utilization and efficiency."

As for requiring EFT systems to provide for consumer credits and reversals of payments in cases where goods or services are faulty, Hollis argued, again, that such a mechanism should not be legislated.

"Consumers will avoid the system that increases their apparent risk," he said.

He added, however, that banks and retailers "must always be alert in such situations to be sure that financial institutions are not inadvertently forced to aid those few consumers who are purposely cheating merchants."

Quoting a vice-president of Gimbel Brothers Department Store, Hollis expressed his view that consumers should be able to use EFT as a substitute for currency without depriving the retailer of the right to treat the transaction as the equivalent of cash. The system must be fair to all "if banks are to have an incentive to invest and all parties are to have an incentive to participate," he said.

Hollis raised a number of questions concerning consumers' objections to "unsolicited" EFT cards, however.

"If you currently hold a credit card and your financial institution installs an automated teller that can be activated by your credit card plus a [PIN], "does the card then become an unsolicited EFT card" Or, he asked, if a bank distributes courtesy cards to depositors to facilitate check cashing in branches and at a later date permits these same cards to activate cash dispensers, do these then become unsolicited EFT cards?

After raising a number of similar questions concerned with the term "unsolicited," Hollis urged his audience to redefine the term.

He also called for the Internal Revenue Service to recognize records relating to EFT transactions as proof of expenditure in lieu of cancelled checks.

The Chase vice-president also told his audience he supported prompt error resolution, as well as updating laws to take into consideration the realities of EFT.

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IBM Ponders Cutting Witness List in U.S. Case

By Catherine Arnst
CW Staff

NEW YORK — IBM recently hinted that it could pare the witness list for its half of the U.S. vs. IBM antitrust trial from 353 names to between 25 and 50, according to a letter from defense attorney Thomas Barr.

But the defense will still be elephantine in size and pace even if the cuts are made, for IBM expects to offer approximately 5,000 documents into evidence.

The government has spent the past 2-1/2 years presenting 51 witnesses and 3,000 documents, or approximately 65,000 transcript pages.

Barr's prediction that the witness list could be limited is fraught with qualifications, however. In his letter to the government, Barr based his estimate on the assumption that "there are no further surprises in the government's witness list"; that stipulations will be reached on the 79 customer witnesses IBM has designated; and "that some reasonable solution can be found to the problem of the 700 nonwitness authors whose documents are in evidence."

This final problem relates to the internal IBM documents the government has placed in evidence without putting the authors or addressees on the stand to testify. Those documents lack foundation without such testimony, IBM claims, and Barr had not come up with a solution to this problem by the date of his letter to the government.

IBM plans to offer the documentary portion of its case first — including such items as documents, Telex vs. IBM record depositions, stipulations and answers to requests for information. This is also the portion during which IBM would call its 79 customer witnesses, but Barr stated the parties could stipulate to all this testimony, thus eliminating the need for witnesses to appear before the court.

Counsel for the defense also wants to reopen discovery of documents from some government agencies in order to update material produced several years ago and conduct a limited program to update the joint census of manufacturers in the computer industry taken by both parties before this case went to trial.

The defense should move somewhat faster than the government's portion of the case, since procedures for offering documents into evidence have grown more efficient as the trial has progressed and IBM has suggested further streamlining.

However, the defense case's pace is nothing but conjecture until at least February, when it is estimated by some observers that the prosecution will finally finish. Dr. Alan McAdams, the government's chief economic adviser for this case, has only recently started his cross-examination after spending 30 days under direct examination.

IBM's cross-examination of government witnesses has usually taken at least twice as long as the witnesses' direct questioning, which could mean another two months of McAdams' testimony.

The government has two more expert witnesses scheduled after McAdams: Dr. Leonard Weiss of the University of Wisconsin and Dr. Lee Preston of the State University of New York at Buffalo.

Meanwhile, the defense team has assigned a new partner from Cravath, Swaine & Moore to the case, probably to replace David Boies, who will leave soon to become general counsel to the Senate Judiciary Committee's Antitrust and Monopoly Subcommittee. The new Cravath attorney is Alan Hruska, whose father, Roman Hruska, served as senator from Nebraska.

FBI Hit for Hiding NCIC Software Flaws

(Continued from Page 1)

the system to make sure there have been no violations," he said, adding that "so far as the FBI is aware, none have occurred."

FBI sources confided their concern, however, about the direction in which NCIC's management is taking the system. "The attitude of the system's management is: 'We'll go ahead with our plans using OS/MVT and hope Edwards and his subcommittee won't notice,' " one source said.

"There has been no effort to conceal NCIC's use of OS/MVT from Edwards' subcommittee that I'm aware of," Neudorfer stated. "It is a matter of record. We've made no attempt to disguise that from Edwards or anyone else."

Frank Buell, section chief of the NCIC, was out of town last week, and his assistant, Raymond Young, said the details of the allegations were "too insufficient" to allow him to comment.

FBI's Plans

The FBI's plans for NCIC include acquisition of the communications equipment needed to switch criminal histories between state and federal users. However, the creation of a national computerized criminal history (CCH) index and an NCIC-CCH message-switching system is under study by the Office of Technology Assessment and the White House at the request of Congress [CW, Nov. 28].

If message switching were approved, the privacy problem inherent in OS/MVT would make NCIC still more vulnerable to unauthorized access of its files, another FBI source said.

Neudorfer said the bureau has long-range plans to exchange its 360/65 for a newer mainframe. This change in equipment would be the FBI's first opportunity to update NCIC's operating system, he added.

IBM dropped its support of OS/MVT at the end of November as a result of its continued enhancement of OS/VS2, an operating system that grew out of OS/MVT.

IBM has addressed and apparently solved the privacy problems inherent in OS/MVT and built safeguards in its newer operating systems — particularly the MVS releases of OS/VS2, according to users in private industry who still employ OS/MVT.

Those users believe the Comptroller General has been correct in his decision regarding further use of OS/MVT. The old software is "full of holes," according to one, while another pointed to studies made in the late 1960s that showed the software's failure to meet security standards which, though not based on the Privacy Act of 1974, covered "much the same area of concern."

The comptroller's decision last January against a Computer Network Corp. plan to furnish the Navy with a time-sharing system for its personnel records was the first time a specific configuration — OS/MVT running on a 360/65 — was found to be below Privacy Act requirements, according to Robert Bigelow, attorney and editor of the newsletter *Computer Law and Tax Report*.

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Datapro Honors Packages

(Continued from Page 1)

ware, Inc.; the Disk Utility System and the Westi teleprocessing monitor from Westinghouse; Epat, a tape librarian, and Grasp, an operating system enhancement, from SDI; and the Fast Dump/Restore package from Innovation Data Processing.

The 1130/Fortran from DNA Systems, Inc.; Librarian from Applied Data Research; Panvalet from Pansophic Systems, Inc.; Syncsort from Whitlow Computer Systems, Inc.; and UCC 1 from University Computing Co. complete the list of three-time winners, Datapro said.

Two-Time Winners

Nine more packages earned places on the Honor Roll for the second year in a row, according to Herb Gepner, Datapro's software editor. CA-Sort from Computer Associates, Inc.; DYL-260 from Dylakor Software Systems, Inc.; Easytrieve from Pansophic Systems, Inc.; IDMS from Cullinane Corp.; and Look from Applied Data Research, Inc. (ADR) are part of that grouping, he said.

So are SAS from SAS Institute, Inc.; Slick from NCI, Inc.; Software 1040 from SAB, Inc.; and SPSS from SPSS, Inc.

The 1977 Honor Roll also includes Adabas from Software AG of North America; CCP On-line Screen Display (S/3) from IBM's General Systems Division; Comput-a-Charge from Value Computing, Inc.; Edos from the Computer Software Co.; Flee/Flim from Goal Systems; and Financial Control System (FCS) from UCC.

Jasper from Datachron Corp.; Quickjob from Systems Support Software, Inc.; Roscoe from ADR; RPG II (S/3) and Sort (S/3) from IBM complete the list, Gepner said.

A report in which Datapro describes the survey process and displays the ratings earned by the honor roll packages and by more than 150 others that received ratings will be available soon, at $12/copy, from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

Explains Reasons for Software Exemption

N.Y. Tax Law Unfair to Service Industry: Lynch

By a CW Staff Writer

NEW YORK – The New York State Tax Commission's ruling that exempts software from sales taxes – a ruling that will deprive this state of an estimated $30 million to $40 million in annual tax revenues – was based on a decision not to apply old regulatory concepts to new types of businesses, according to Tax Commissioner Thomas H. Lynch.

In a recent interview here, Lynch explained the ruling [CW, Nov. 21] reflected the realization that much of the state's tax structure is based on a manufacturing economy – a situation that no longer exists in this northeastern state.

New York has evolved into a services-based economy, and many of the tax regulations now on the books are not equitable when applied to services, he said.

The tax commission decided to exempt software from sales taxes rather than present the issue to the courts because its function is to determine taxes equitable to both the state and the taxpayer, he said.

After the commission has examined such tax situations, courts generally uphold its views, he added. If the commission viewed its function as simply garnering revenues and acted accordingly, however, the result could be court contests, he said.

In the case of software taxation, Lynch said he thought the commission could have ruled either way on the issue and been upheld in the courts. If the commission had taken the position that software should be taxable, it probably would have had enough to hang its hat on and go to the courts, he said.

On the other hand, since the state had been silent on the taxation of software for more than 10 years, it could be argued the taxpayer could legitimately think software was not taxable. The commission then would have had to show a very clear legislative intent to tax software in order to suport such taxation, he said.

When asked about the prospect of an appeal of the decision, Lynch indicated the only possibility is legislative action – "it's within their province," he said.

In effecting tax reform, the first step is to examine the tax law and place it in line with a service-based economy, Lynch stated. However, that doesn't mean the tax commission is about to exempt a sector of business from sales tax just because it is a service business, Lynch observed.

But the commission believes it cannot simply take old words out of a statute and apply them to a new area without listening to the industry, Lynch said. And, he added, the commission did listen to the DP industry.

Lynch indicated one of the primary reasons for his involvement in the issue was the impact of the Aug. 23 meeting at which various industry representatives explained different aspects of data processing, such as time-sharing and software. "The presentation struck me immediately – without having the facts – that we were acting inequitably," he recalled.

The commission realized its campaign to gather sales taxes retroactively was "putting the cart before the horse."

The sales tax is a "horrendous," inequitable law, which is even worse to oversee, Lynch said. Although the commission would like to see it go away, the law does produce $3 billion in revenues, he conceded.

There's a need for new solutions; the state can't use old concepts and apply them to new businesses, he said.

An example of applying old concepts is the treatment of the time-sharing industry. Under the old rationale for taxing time-sharing, the key words "dominion and control" were pulled out of statutes and applied to those instances in which the buyer was deemed to have control or dominion over the DP gear.

After listening to presentations in August, the tax commission decided to tax time-sharing based on the underlying transaction. For instance, if a payroll performed manually was normally taxed, then a similar service performed via time-shared computer would also be taxed.

The tax commission is anxious to work with the industry in evolving ways in which the industry can comply to the state's satisfaction, Lynch said.

For example, one problem in the time-sharing situation is how the time-sharing firm knows for what purpose the customer is using the DP facilities.

Through cooperation, Lynch hopes to avoid such thorny problems later.

Lynch and the rest of the commission have stated categorically that sales tax exemption of software does not apply to retail sales of such items as programs for home TV games, for example. "You have to draw a line on what is retail, but I think we can find that point pretty well," he said.

Some cases Lynch used as precedent for the commission's decision were the cable TV case, in which the state had remained silent for 12 years, Dun & Bradstreet, Inc. vs. City of New York and Booth vs. City of New York, which illustrated the media is an incidental aspect of intangible property.

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Maverick HIS Users Announce Parley in Dallas

DALLAS — The Independent Honeywell Group (IHG), an association of owners and users of older Honeywell Information Systems, Inc. small and medium-scale computer systems, will meet here Jan. 16 at the Airport Marina Hotel.

All interested H200/2000 users are invited to attend and to join the group as charter members prior to formal incorporation of the group — a move that is expected to take place in the near future, according to A.J. Nowotny, president of Compunetics Corp. of Falls Church, Va., who is serving as interim "exec" for the group.

IHG was organized to help members who wish to handle their own maintenance or at least maintain their systems without HIS maintenance contracts by mass purchasing and stockpiling of repair parts.

This effort was mounted to avoid long waits for parts from HIS and maintenance charges many users considered too high.

'Money in Peripherals'

The group, which so far is composed of 23 companies with more than 90 H200/2000 systems, believes it has discovered what the manufacturers have known all along: "The money is in the peripherals," according to Nowotny.

The disks, tapes, printers and equipment offered with the older systems are "as good as the day they were built," and for some gear that was nearly 15 years ago, he said.

Further, they provide a price/performance ratio "as good as any built today," he contended.

While the computer industry is plunging forward into micrologic for CPU/control functions, the I/O devices are not changing much, except by increasing in price. "Since HIS is finding it difficult to hold down contract maintenance costs on its older H200/2000 systems, the IHG users are finding we would rather do it ourselves," he said.

Nowotny went on to explain that although the older systems are based on discrete transistor logic on printed circuit (PC) boards, IHG users are selectively upgrading certain troublesome functions with erasable programmable read-only memory (Eprom) chip logic designed on the old plug-compatible PC boards.

Many of the older HIS systems now coming off seven-year leases can be purchased outright for 10% of the original price, he said.

Users who purchase these systems for 10% to 20% of the price of today's new systems can keep their old programs running, save cash and development talent and thus plan their eventual entry into on-line remote terminal operations with greater care, Nowotny said.

Annual dues in IHG — a nonprofit organization — are $100. This entitles the user member firm to receive the "IGH Quarterly" and gives person-to-person contact with IHG member companies that are "doing their own thing," Nowotny said.

Additional information is available from Nowotny at IHG-Compunetics, Box 726, Falls Church, Va. 22046.

Stag to Conduct Tax Powwow

BURLINGAME, Calif. — The California State Board of Equalization has agreed to schedule a public hearing early in February to discuss taxation of data processing, according to Donald Mulvey, president of the Sales Tax Action Group (Stag).

Stag will hold a preparatory meeting Jan. 11 at 6:30 p.m. at the Sheraton Inn in Burlingame.

Further information is available from Mulvey at Computer Services Associates, P.O. Box 13172, Oakland, Calif. 94661.

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COURSE	DAYS	FEE	JANUARY 1978	FEBRUARY 1978	MARCH 1978
Structured Caravan	1	$50*	5 Wash. DC 9 Toronto 11 Chi. 13 S.F. 16 L.A. 18 Houston 20 Boston 23 N.Y.		
Introduction to Techniques and Tools of Structured Systems Development	1	175	30 Chi.	22 S.F.	15 Wash. DC 20 Toronto
Managing Systems Development: A Structured Approach	2	325	31-Feb. 1 Chi.	23-24 S.F.	16-17 Wash. DC 21-22 Toronto
Structured Analysis	2	325	30-31 S.F.	6-7 Chi. 27-28 Wash. DC	6-7 Boston 13-14 L.A. ~~27-28~~ Toronto
Structured Design	3	475		1-3 S.F. 8-10 Chi.	1-3 Wash. DC 8-10 Boston 15-17 L.A. 29-31 Toronto
Structured Analysis Design Workshop	5	625	30-Feb. 3 Wash. DC	6-10 Toronto 13-17 Boston 27-Mar. 3 L.A.	6-10 S.F. 13-17 Chi. 27-31 Houston
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Software Reliability	5	625	30-Feb. 3 L.A.	13-17 Chi. 27-Mar. 3 Toronto	6-10 Wash. DC 13-17 S.F. 27-31 Boston
Structured Programming for COBOL Programmers	2	325		23-24 Wash. DC	20-21 S.F.
Infotech/Jackson Design Technology Workshop	10	1400	16-27 Chi. ** 30-Feb. 10 S.F. **	27-Mar. 10 Houston**	6-17 L.A. ** 13-24 Boston **
Data Base and the Organization	3	475	16-18 S.F.	13-15 Wash. DC	20-22 Houston
Data Base Package Analysis & Selection	3	475	9-11 Chi. 23-25 Wash. DC	13-15 Toronto	13-15 Houston 20-22 Boston
Data Base in a Distributed Processing Environment	2	325		27-28 Boston	6-7 Chi. 20-21 S.F.
Data Base Management Systems for Minis—A Comparative Analysis	3	475			1-3 Boston 8-10 Chi. 22-24 S.F.
Systems Design in a Data Base Environment	2	325		6-7 S.F. 27-28 Chi.	27-28 Wash. DC
Designing Effective Data Bases	3	475		8-10 S.F.	1-3 Chi. 29-31 Wash. DC
Transaction Oriented Processing	2	325		27-28 Toronto	6-7 Houston 27-28 Chi.
Transaction Processing Control Systems—A Comparative Analysis	3	475			1-3 Toronto 8-10 Houston 29-31 Chi.
Data Dictionary/Directory Systems—Management Overview	1	175		24 Boston	13 N.Y. 31 Wash. DC

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. . . will be pitching its tents at eight oases during January. Admittedly, some of these oases will probably be a trifle chilly, but . . . anyway an oasis needs dates, and you can find ours in the schedule to the left.

The morning program of the Caravan will consist of three talks: **The Role of Structured Analysis in the System Development Life Cycle**—by Raymond Eisenstark of Structured Methods—**Developing Systems in a Data Base/Data Dictionary Environment**—by Hal Uhrbach of DBD Systems—**Structured Methodologies for Software Development**—by Andrew Pinkowitz of Structured Methods. The afternoon program will allow small groups of attendees to participate in each of three intense one-hour clinics. These clinics will deal with the topics presented in the morning session. The fee for the Caravan, including lunch and all materials is $50 . . . and we issue a $50 credit towards any other Structured Methods product or service.

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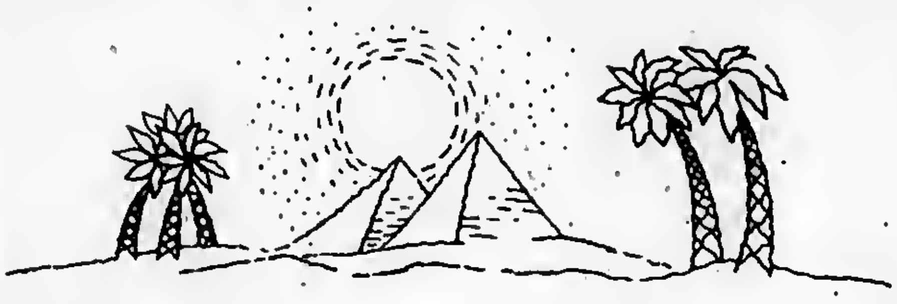

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Call for Papers

COMPUTING IN CIVIL ENGINEERING, Atlanta, June 27-29, 1978.

The conference is for civil engineers involved with computing or wishing to familiarize themselves with it. Topics include legal aspects, graphics, structural applications, international activities and programming languages.

Those interested in presenting a paper at one of the sessions should contact Morton B. Lipetz, Edkel Data Services, 8 Park Place, Newark, N.J. 07102 as soon as possible.

INTERNATIONAL CONFERENCE ON INTERACTIVE TECHNIQUES IN COMPUTER-AIDED DESIGN, Palazzo dei Congressi, Bologna, Italy, Sept. 21-23, 1978.

The conference will focus on the state of the art of computers as a design tool and will concentrate on the most recent developments in hardware and software. Papers are invited on information management systems for computer-aided design applications; man-machine interaction; systems architecture; computer-aided design/management applications; education; and organizational and social implications.

Five copies of a 1,000- to 5,000-word paper should be sent by Jan. 31 to the program chairman, Umberto Cugini, Instituto di Disegno di Macchine, Politechnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy, or to the North American coordinator, Ira Cotton, Institute for Computer Science and Technology, National Bureau of Standards, Washington, D.C. 20234.

17th ANNUAL TECHNICAL SYMPOSIUM, National Bureau of Standards, Gaithersburg, Md., June 15, 1978.

The symposium is entitled "Tools for Improved Computing in the 80s." Papers are requested that describe the application of tools and techniques in such areas as auditing, data encryption, programmer teams, simulation and standards.

A 150-word abstract and four copies of the complete paper should be sent by Jan. 31 to Dr. Bryce Elkins, Computer Sciences Corp., 400 Army-Navy Drive, Arlington, Va. 22202.

INTERNATIONAL CONFERENCE & EXHIBIT OF THE INSTRUMENT SOCIETY OF AMERICA, Philadelphia, Oct. 15-19, 1978.

The emphasis will be on current practices in instrumentation deign and implementation.

Papers are sought which introduce or explain techniques or innovations in instrument and control system design, testing, operation and maintenance.

Suggested topic areas include chemical and petroleum, cryogenics, food, marine sciences, power, telemetry, waste and wastewater and pulp and paper.

The deadline for unsolicited abstracts is Feb. 1. Abstract forms should be requested from and completed forms returned to Philadelphia/78, Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pa. 15222.

INTERNATIONAL MICROCOMPUTERS MINICOMPUTERS MICROPROCESSORS '78 CONFERENCE, Palais des Exposition, Geneva, Switzerland, June 20-22, 1978.

Topics include microcomputer technology, industrial control and automation applications, small business systems, personal computing, testing and standardization and peripherals for minicomputers and microcomputers.

An abstract should be sent by Feb. 15 to Dr. F.L. Morritz, Industrial and Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

Security Symposium Set

SCOTTSDALE, Ariz. — The fourth annual Computer Security and Privacy Symposium, sponsored by Honeywell Information Systems, Inc., will take place here April 18-19, according to Jerome Lobel, organizer of the two-day session.

Recent concerns in information, security and privacy such as third-party liability and international data flow will be among the topics discussed. Technical advances as well as legislative activities since 1977 will also be covered.

The registration fee, including advance copies of selected papers and the proceedings, is $425. Registrations received before Jan. 1 will be discounted $50, Lobel said.

Additional information can be obtained from HIS, P.O. Box 6000, Mail Station K-99, Phoenix, Ariz. 85005.

Magazine Honors Biomation Head

CUPERTINO, Calif. — B.J. Moore, president of Biomation Corp., has been presented with the 1977 *Electronics* magazine Award of Achievement for his pioneering development of the electronic logic/analyzer instrument.

Moore shares the honor with Charles House of Hewlett-Packard Co., who simultaneously and independently designed a similar device.

Moore joined Biomation in 1969 as a vice-president of engineering and was named to head the company in 1971.

The logic/analyzer is a device used for the measurement and testing of microprocessor and other digital electronic equipment.

LaPlant Receives CDP Award

WASHINGTON, D.C. — An employee of the Air Force Data Services Center here received an award for excellence for attaining the top score on the computer programming and software section in this year's examination for the Certificate in Data Processing (CDP).

William LaPlant, the winner, is planning to complete the requirement for an M.S. degree in the management of technology from American University.

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*U.S. domestic price [illegible] above).
Other [illegible] cost.

Sexes Equal in DP? 10-Year-Old Girl Asks

By Eve R. Wirth
Special to CW

When members of the grade-school set scribble letters to the computer industry, anything can happen. Here is an example of ruptured rhetoric that will tickle your funny bone:

Dear Computer Company President,

We are learning stuff about computers. I hope you can help me. Here goes: My boyfriend Stevie, who will remain nameless to you in this letter, made me a big fat bet for 50 cents in our classroom today. We bet it together when no one was looking as we hung up our sneakers on the hook in the closet. We decided it after learning what computers really do and who does it.

Stevie keeps saying that lady people can't become live computer workers. And I keep saying they can too. Please know right off that Stevie is a stinking shovanest pig boy human bean. I hate him because of what he said to Alice last summer in the shed, but don't tell Stevie I know he said it to Alice.

Anyhow, could you please check yourself for the answer if ladies can do it with the guys? Put it in paper for Stevie, the rat fink to see, because I need his 50 cents to take my other boyfriend Wally to McDonald's. Don't tell Stevie, or he will punch Wally right smack in his new braces. Hurry with your answer.

Your good friend Lena
(age 10 yrs 8 mos.)

Fine Print Called Vendor 'Trick'

WINTER PARK, Fla. — Industry vendors deter users from fully understanding form agreements by using "tricks" that keep the documents hard to read, according to a recently published computer negotiations report.

Written agreements are often produced in type so small that any user trying to read one would suffer eyestrain, according to a recent article in CNReport's Issue 6. Further, the report maintained, the situation is even worse when pages in fine print have been mimeographed on obsolete equipment.

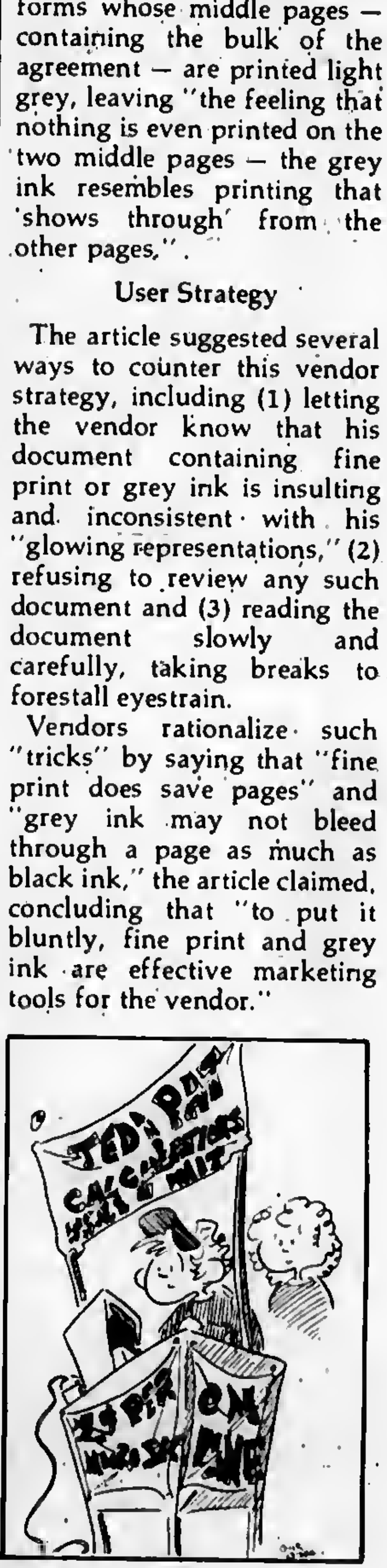
Light Grey Ink

Another ploy deterring comprehension is printing an agreement's interior pages in "light grey" ink that contrasts so little with the page that the words are nearly illegible. For example, the article cited "one top-five manufacturer" as employing "sale agreement" forms whose middle pages — containing the bulk of the agreement — are printed light grey, leaving "the feeling that nothing is even printed on the two middle pages — the grey ink resembles printing that 'shows through' from the other pages,".

User Strategy

The article suggested several ways to counter this vendor strategy, including (1) letting the vendor know that his document containing fine print or grey ink is insulting and inconsistent with his "glowing representations," (2) refusing to review any such document and (3) reading the document slowly and carefully, taking breaks to forestall eyestrain.

Vendors rationalize such "tricks" by saying that "fine print does save pages" and "grey ink may not bleed through a page as much as black ink," the article claimed, concluding that "to put it bluntly, fine print and grey ink are effective marketing tools for the vendor."



by batch alone.

Two major features put the HP 3000 in a class by itself. The first is our state-of-the-art operating system, a Multiprogramming Executive that can manage a vast workload extremely fast. When we clocked one second of MPE activity, it handled 2,280,000 micro instructions in the central processor, 14 file accesses, seven input swaps and five output swaps.

This ability to "juggle" batch and on-line jobs lets you develop new programs on the HP 3000 while it's running your old ones. And we offer six "big computer" languages to keep your programmers happy. With COBOL, RPG, FORTRAN, BASIC, APL (Series II only), and SPL (our streamlined Systems Programming Language), you can develop the precise programs your company needs.

Virtual memory plays an important role in this performance. It gives you an almost unlimited program size by keeping the code and data on your disc, swapping only those parts that are needed in main memory. This operation is totally transparent to the user. And it's speeded up by our new 50 megabyte discs, with 5 ms seek time track to track.

The second major attribute is the HP 3000's powerful data management capability. Our IMAGE/3000 software, good enough to be named to the Datapro Software Honor Roll, puts a sophisticated Data Base Management system (1) literally in your hands. You can access files of consolidated data with our simple inquiry language, QUERY. Or use KSAM (Keyed Sequential Access Method) on our Series II to call up a series of related files. Our DEL/3000 Data Entry Library simplifies your terminal-oriented transactions.

A variety of HP terminals also makes it easier to input or call up data. For instance, our new graphics terminal (2) provides auto-plots at the touch of a key. And a new printing terminal (3) keeps information flowing from the factory or warehouse.

Another "big computer" feature is fault-correcting memory on the HP 3000 Series II. If a circuit fails, the memory automatically corrects itself and stores information about the faults in a RAM. Our engineers will call up that information during routine maintenance and replace the faulty circuit.

We offer two basic systems, based on CPU speed and main memory size. They're both very easy to expand to fit your needs, with additional discs, tapes, terminals, printers and other I/O devices. And, as we manufacture virtually everything in our systems, we can give you fast, knowledgeable service on any part of them.

So why don't you give us a call? Or write to Bill Krause, Hewlett-Packard, Dept. 315, 11000 Wolfe Road, Cupertino CA 95014. Instead of a computer that does batch but can't handle on-line jobs, you could soon have an HP 3000 that does it all.

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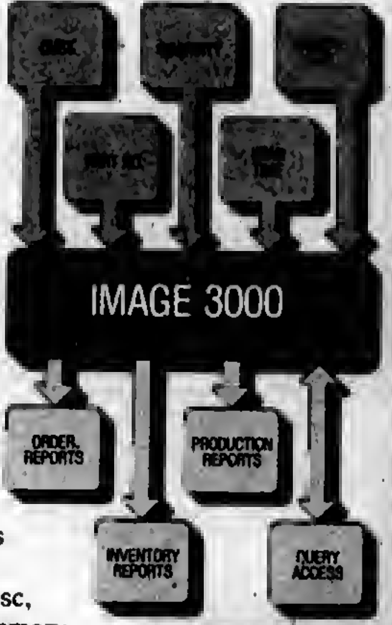

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Favoritism Charges Shake City CPU Selection

By Jeffry Beeler
CW Staff

KNOXVILLE, Tenn. — A panel of DP professionals appointed to advise officials here about the acquisition of a computer system apparently recommended that the city limit its hardware selection to IBM or IBM-compatible equipment.

In a story published Dec. 2, the Knoxville *Journal* reported that the chairman of the city's Computer Advisory Committee, Tom Sudman, urged fellow members at a May 11 meeting to "get to evaluating what IBM step you want, set up the specs and go get it. My suggestion is a 360."

The newspaper account appeared shortly after one of the paper's reporters received permission from Mayor Randy Tyree to listen to portions of the tape-recorded meeting.

Later during that same session, municipal DP director James Ryan, who has objected to limiting competition for the city's computer contract, asked the committee, "Do you want me to put the bid specs to say IBM or IBM-compatible hardware?" An unidentified committee member allegedly replied, "That about sums it up."

Rigging Denied

In a recent telephone interview, Sudman denied that comments made at the meeting indicated a conspiracy to rig the city's computer procurement for IBM's benefit.

"People who think we were trying to pull something at that meeting are a little paranoid or are shooting at ghosts," said Sudman, a former IBM marketing representative and now head of United American Service Corp. here.

"I'd venture to say that, between us, the committee members represent a minimum of $25 million worth of computer equipment procurements, and probably less than half of that equipment is IBMs."

If commitee members did try to fix the outcome of the computer selection process, their actions would probably constitute a violation of the city's procurement laws, which forbid favoritism in awarding government contracts.

The controversy over the city's proposed computer plans began when Ryan, who assumed his current position last February, expressed dissatisfaction with the community's existing General Electric (now Honeywell Information Systems, Inc.) 437 system. Ryan complained HIS has delivered only three of the 20 software packages called for in its four-year-old contract with the city.

At first, he tried to resolve the contract dispute through negotiations with the company, he reported. But when those efforts failed, Ryan concluded that HIS had irreparably breached its contract with the city and that he would have to find a replacement for the system.

The search for an alternative shifted into high gear on Sept. 7, when Ryan and his staff mailed bid requests to 16 mainframe manufacturers. By Oct. 5, the city had received 17 hardware proposals from nine bidders including IBM, Univac, Burroughs, and HIS.

Nine days later, Ryan informed Burroughs that, based on a technical review of all specifications, the city had tentatively selected an $8,145/mo B2810 system as the lowest "responsive" bid. Burroughs and the city signed a letter of intent for the system in late October.

Since then, however, the computer procurement "has gotten in politics," Ryan said. Shortly after the DP director issued his bid requests, Sudman and several other committee members complained to Tyree that the committee had not been consulted before the city's DP department issued its bid requests.

Sudman also raised several other questions; which he claimed Ryan and his staff had failed to address when they began their search for a new system. He contended, for example, that the city DP department had not demonstrated conclusively that it could successfully terminate its existing contract with HIS, which is not scheduled to expire until mid-1979.

Sudman denied allegations that his committee tried to force a redrafting of the computer specifications and that the group meddled in the selection of the new system. "We're not a selection committee, nor are we a technical review committee," he said. "Our problem is merely to decide whether the city in fact needs a new computer system and to address some of the related issues."

Nevertheless, shortly after Sudman and his colleagues called Tyree to criticize the request for proposals, the mayor referred the selection question to the committee, which previously had been involved in other matters. That decision has fueled suspicion that the committee used its influence to persuade the Tyree Administration to suspend negotiations for the Burroughs system, and published accounts of the May 11 meeting did not dispel those doubts.

One person who believes the committee is trying to block or delay the acquisition of the Burroughs system is Ryan, although he confesses ignorance about the group's motives.

Ryan has argued against excluding any vendors from competition for the contract, and when he drafted the city's bid specifications he omitted an "IBM or IBM-compatible" clause, disregarding the committee's May 11 recommendation.

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About HP's new 7925? First off, the much-talked-about 120 mb drive is still just that: *talk*. And in the context of "how much less," you can't get too much less than "not yet available." When the 7925 *does* arrive, there will be other "lesses" to contend with. *Less capacity*: 30 mbs less per drive. *Less reliability*: Remember, this is an unproven product from a company whose major business is computers, not drives. When you add to that the fact that, megabyte for megabyte, the HP7925 is going to cost considerably more than our 1677, it doesn't make a whole lot of sense to wait.

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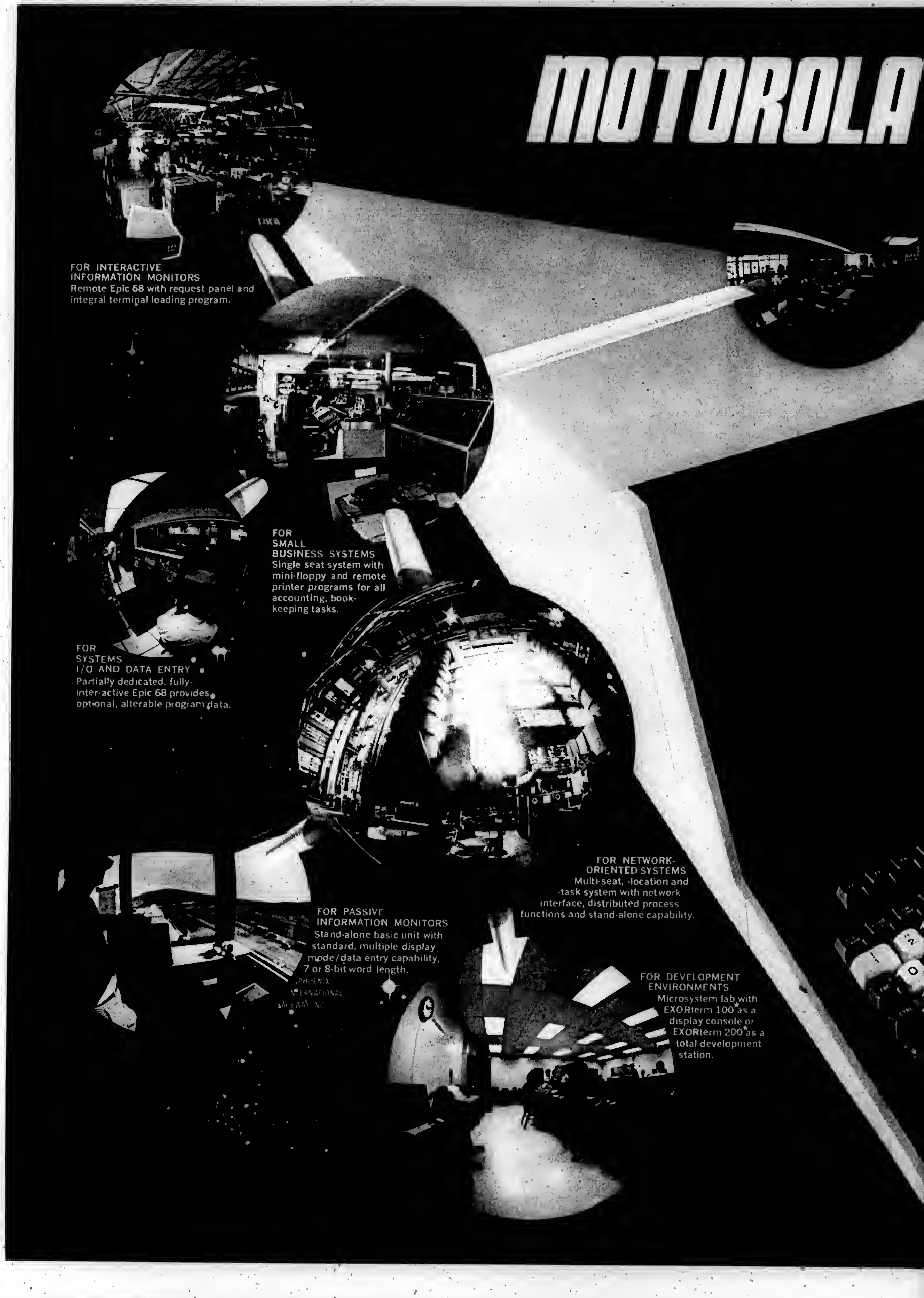

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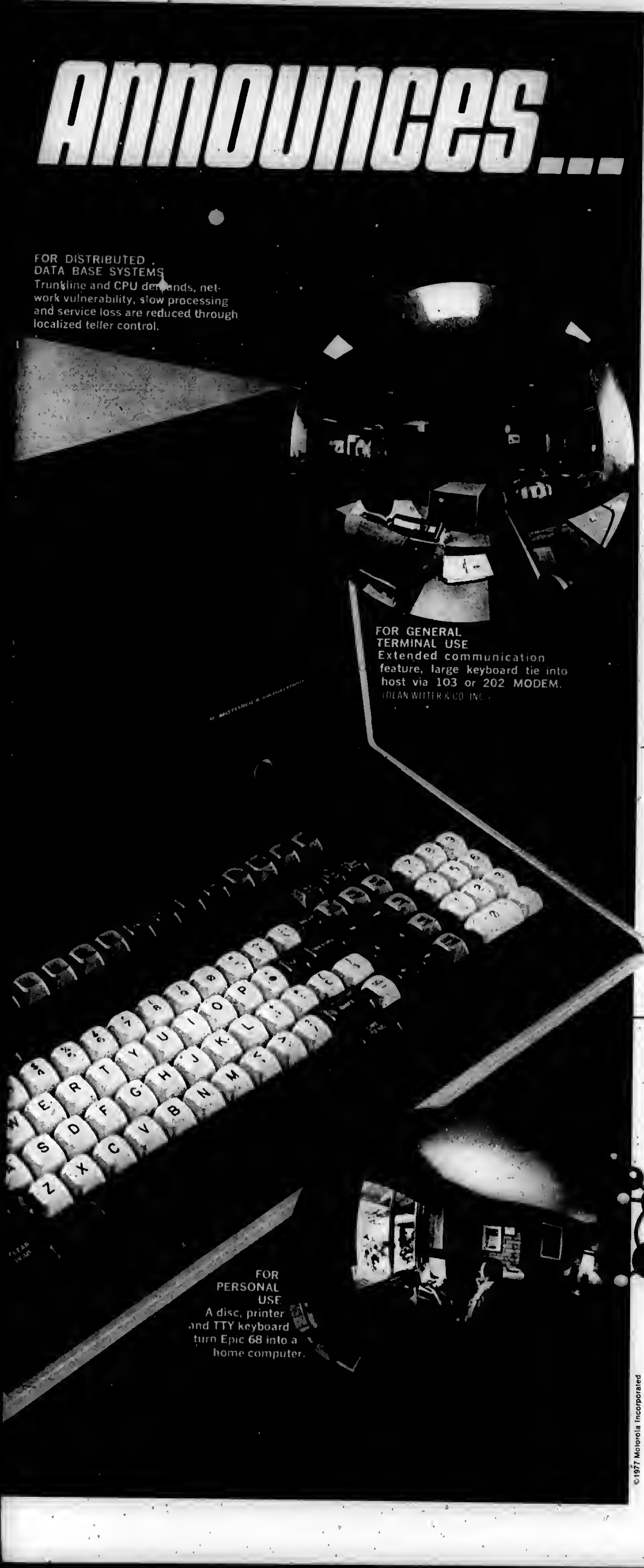

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Service Lets 1,000 Libraries Share, Update Catalog Data

By Brad Schultz
CW Staff

COLUMBUS, Ohio — More than 1,000 libraries in 46 states use an online DP network based here to share and continuously update bibliographic information and catalog document cross-references.

The Ohio College Library Center (OCLC) here operates the network, used to access more than 3.4 million bibliographic records and to catalog more than 200,000 documents in a typical week, for which the center custom-prints about 1.5 million catalog cards, OCLC public relations editor Bill Schieber said.

An array of minicomputers backed by four mainframes in Columbus is the network's hardware kernel. This includes nine Digital Computer Controls; Inc. D116 minicomputers, compatible with Data General Corp. Nova 1200 series minicomputers, augmenting four Xerox Sigma 9 CPUs, Schieber noted. A tenth D116 is maintained as a spare.

Beehive International, Inc. specially made the 1,800 OCLC 100 CRTs used around the country to access the Columbus hardware via 18 leased, synchronous telephone lines or the Tymnet communications network, he noted.

The system is used for such user tasks as record searching and text editing and for such user services — performed by the center — as customer-printing catalog cards and generating labels to identify individual documents, Schieber said.

In the event that a bibliographic record cannot be found in the OCLC data base, the user may compose the record and contribute it from his terminal.

Some users prefer to have hard-copies of references rather than only CRT displays.

At the Yale University Library in New Haven, Conn. for example, three General Electric Co. Terminet 120 line printers are used for this purpose. These printouts facilitate local searches and data base revisions.

The Terminet 120 prints a typical OCLC full-screen display in nine to 10 seconds, according to David L. Weisbrod, head of the Library's Systems Office. Two OCLC 100s can thus be serviced by one printer with little time lost in waiting, he explained.

At James Madison University in Harrisonburg, Va., Christina Bolgiano, coordinator of technical services, commented "We've only been on the OCLC system since April, but I don't know how we got along without it.".

The OCLC is a nonprofit corporation founded in 1967 to make library resources generally more available and cost-effective.

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EFT Association Seeks Members

WASHINGTON, D.C. — The Electronic Funds Transfer Association, an organization dedicated to promoting the advantages of EFT, has launched a campaign for charter members.

The membership fee is $500.

Companies wishing to join should contact Henry V.Z. Hyde Jr., Executive Vice-President, EFT Association, 1620 Eye St., Washington, D.C. 20006.

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burg, Va., Christina Bolgiano, coor-
cusses the cataloging of a recent ac-

FAA Installs Low Altitude Warning Systems

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has recently installed low altitude warning equipment at 63 major U.S. airports to tell air traffic controllers when planes are too close to the ground.

Called the Minimum Safe Altitude Warning (MSAW) system, it has been installed in all automated radar terminal (Arts III) airports in the country. The system alerts controllers when an aircraft equipped with automatic identity and altitude-reporting equipment is detected at a potentially unsafe altitude within 55 miles of the airport terminal.

The alert consists of a five-second audible alarm and the letters "LOW ALT" flashed on the controller's radar scope above the appropriate aircraft target.

MSAW spots the unsafe conditions by automatically monitoring aircraft altitudes and comparing them to an altitude table programmed into the Arts III computer.

Weather System

The FAA is also planning to install an Aviation Weather and Notice to Airmen System (Awans) at the Indianapolis flight service station to improve preflight and in-flight pilot briefings.

Awans collects, processes and stores weather and aeronautical information which can be called up on a CRT by the flight service specialists.

Large CRT screens display graphic information including weather facsimile maps and weather radar pictures while smaller individual screens show both graphic and written data.

Available data includes meteorological information from hundreds of sites nationwide. The system also displays notices to airmen about closings or restoration of facilities and services.

The weather radar pictures cover areas from 125 to 200 miles in radius from any of 52 National Weather Service radar stations throughout the country.

The systems are part of the FAA's airport safety program.

Calendar

Jan. 5-8, Honolulu — **11th Hawaii International Conference of System Science**, sponsored by the Association for Computing Machinery. Contact: U.W. Pooch, Industrial Engineering Department, Texas A&M, College Station, Texas 77843.

Jan. 9-11, Boston — **Seminar on Data Communications Network Design**, sponsored by Advanced Management Research. Contract: AMR International, Inc., 1370 Ave. of the Americas, New York, N.Y. 10019. Also being held Feb. 13-15, Washington, D.C.

Jan. 10-11, Washington, D.C. — **National Information Policy Options Conference**, sponsored by Information Industry Association. Contact: Helena M. Strauch or David Carvey, Information Industry Association, Suite 904, 4720 Montgomery Lane, Bethesda, Md. 20014.

Jan. 22-26, San Francisco — **RX for Growth**, sponsored by Electronic Representatives Association. Contact: Raymond J. Hall, Executive Vice-President, Electronic Representatives Association, Suite 1003, 233 E. Erie St., Chicago, Ill. 60611.

Jan. 22-28, Chicago — **American Library Association Midwinter Meeting**, sponsored by American Library Association. Contact: American Library Association, 50 Huron St., Chicago, Ill. 60611.

Jan. 23-25, Tucson, Ariz. — **Fifth Annual ACM Sigact-Sigplan Symposium on Principles of Programming Languages**, sponsored by the Association for Computing Machinery. Contact: Prof. L. Reeker and Prof. D. Ripley, Department of Computer Science, University of Arizona, Tucson, Ariz. 85721.

Jan. 23-25, Atlanta — **Seminar on Minicomputers and Distributed Processing**, sponsored by the University of Chicago, Center for Continuing Education. Contact: Information Systems Seminars, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Jan. 23-25, New York — **Seminar on Data Processing Operations Management**, sponsored by the University of Chicago, Center for Continuing Education. Contact: Information Systems Seminars, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Jan. 23-25, New York — **Automating Business Communications**, sponsored by the American Institute of Industrial Engineers (AIIE). Contract: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held July 17-19, Washington, D.C.

Jan. 30-31, Worcester, Mass. — **Seminar on Project Management**, sponsored by Worcester Polytechnic Institute. Contact: Donna Johnson, Worcester Polytechnic Institute, Worcester, Mass. 01609.

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Editorial

ACM Stand on Human Rights

The Association for Computing Machinery's (ACM) decision to cut all ties with computer scientists in the Soviet Union (CW, Dec. 12) is more of a symbolic act than one that will have far-reaching consequences.

But the move is certainly a step in the right direction and stands out as a beacon in the computer community where all too often the issues of human rights are ignored, particularly by vendors.

The ACM made its stand over the issue of the jailing of Soviet computer scientist Anatole Sharansky who had been active in the human rights movement in the USSR.

We hope the group will now move to cut its ties to other countries that have particularly repressive regimes and who deny basic human rigths to their citizens. South Africa and Chile come immediately to mind.

But the ACM's act was symbolic. It will not slow the flow of computers and computer technology to those countries, because the U.S. computer industry will not pass up making a buck for moral considerations.

The major mainframers will blithely continue to trade with any country that is recognized as a legitimate trading partner by the U.S. government. After all, "business is business" and business is apolitical, they say. Apparently computer business is also amoral.

ACM is to be congratulated for taking its stand. Hopefully it will help in Sharansky's case.

But a much more powerful force could be brought to bear if the industry chose to use its voice for human rights.

No Sunshine Here

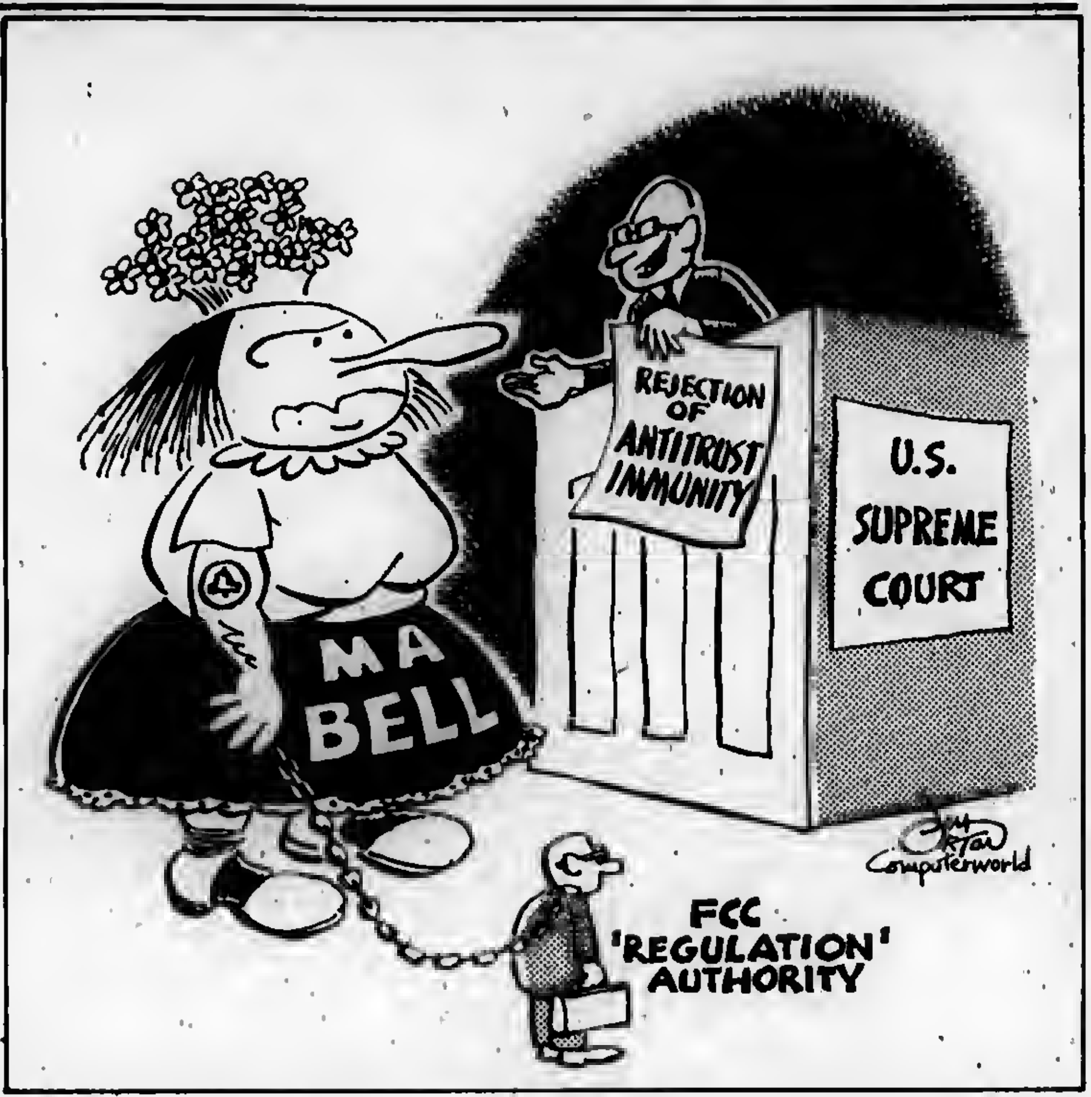
President Jimmy Carter promised an open administration, but apparently the word hasn't gotten through to the Justice Department.

When IBM legal counsel proposed the government settle its case against the firm a few weeks ago, [CW, Dec. 12], the public was able to find out about the proposal only through unofficial sources in the department.

The men in charge of the department refused to even answer reporters' calls about the meeting between the two groups, much less to discuss what had happened at the meeting.

So once again it appears this administration will follow the example of its predecessor in such matters. If a settlement in what is probably the most important antitrust case in half a century is to be made, it will be made in secret, behind locked doors, only to be sprung on the public as a fait accompli.

It's business as usual in Washington. Businessmen representing alleged monopolizers have the ear of top officials while the public gets a cold shoulder.



'Notwithstanding How Faultless the Situation Now Appears, the Possibility of Even Further Improvement Should Not Be Ruled Out.'

Letters to the Editor

Tragedy or Comedy?

I have a problem characterizing an article I read in the Nov. 28 issue. Was it meant to be comic or tragic that an IBM System 32 user reported, "We started with a 40 char./sec print capability and 5 million words of on-line disk storage . . . upgraded the system several times and now have 155 line/min print capability and 13M words of on-line disk storage." ["Riverbend Farms Growing More Than Fruit"].

The poor soul was sold a system that met 38% of his storage requirements and produced hard copy at about one-seventh the speed needed.

Whether laughter or tears is the proper reaction to this tale is a moot point since virtue did triumph. The user took a bold stance in response to the treatment he had received. His courage and forthrightness met with success. IBM accepted his order for a System 34.

Alan Gotthelf
Van Nuys, Calif.

Confusing the 'Learner'

There have been some not-so-hot definitions in the microcomputing "Learner's Lexicon," but I've managed to suppress the urge to complain until reading the definition of "buffer" [Nov. 28].

The definition given is a confused mish-mash of different meanings including 1) the circuit element (such as 1/6 of a 7404 or 7407 TTL package, or an op amp connected for unity gain, etc.), 2) the computer memory space assigned to setting up and holding blocks of data for I/O, 3) the device (such as a special tape unit or a FIFO memory) commonly used for interfacing devices with different communication speeds and 4) perhaps several others.

The most common use of "buffer" among your readers is probably the software sense referring to the memory used for blocking/deblocking I/O. I shudder to think of the "learner" who needs to know this and tries to figure it out from the definition given.

Can you envision this neophyte trying to figure if the buffer is inverting or noninverting? ("Inverting or noninverting" only applies to the circuit element type of buffer and is nonsense otherwise.)

Henry E. Schaffer
Raleigh, N.C.

A More Believable Formula

In the article "Perfect Chargeout Just Not Obtainable" by Lawrence H. Cooke Jr. [CW, Oct. 17], I have found a new arithmetic fact: $3^2 = 8$.

This formula is not correct, obviously. I believe that what is desired is the number of possible outcomes in a true/false situation: where x is the number of variables, there are 2x possible outcomes.

This would make the formula $2^3 = 8$, which is rather more believable.

Robert L. Sample
Chattanooga, Tenn.

Computer*world* welcomes comments from its readers. Preference will be given to letters of 150 words or less. Computer*world* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
Dec. 20, 1972

BETHESDA, Md. — After a year-long probe into the computerizing of files by Social Security Number (SSN), a government advisory committee was reported leaning toward the conclusion that the SSN would not make a good universal identifier. The committee was also expected to recommend early in 1973 whether the very existence of a universal identifier would be in the public interest.

— — —

MOUNTAIN VIEW, Calif. — Vadic Corp. announced plans to introduce a modem to reduce line costs by 50% and increase operating efficiency for data users. Capable of operating in full-duplex mode over a single two-wire phone line, the synchronous modem would provide four times the data rate of Bell's 103 data set while maintaining the same line discipline for connect, handshaking and disconnect functions, Vadic said.

Eight Years Ago
Dec. 24, 1969

NEW YORK — General Electric's Information Systems Division began a major cutback in its personnel, computer centers and sales offices. While admitting it was making "some adjustments" in its time-sharing arm, GE emphasized it would continue its "major commitment" to the time-sharing field.

— — —

LOS ANGELES — Major nationwide service bureau operations cut back severely in face of serious losses during 1969. Personnel and service bureau cutbacks were rampant throughout General Electric, ITT and Data Processing Financial & General.

For 'Beginners'?

'Home' Computer Catalogs Jargon-Ridden

By Jack Stone
Special to CW

"Boycott!" he exclaimed. "The tour is off for me this year! I'm finished with those so-called 'home' computers until their manufacturers shape up and start to talk to us long-time electronic hobbyists in our terms and not in their dumb computer jargon."

That was the greeting I had last week when I stopped by the home of Captain J. Donald Griffin, the world's most compleat electronic hobbyist. The occasion was to be our annual pilgrimage to the major electronics stores in the Washington, D.C., area; each year we indulge ourselves in fantasies of a massive upgrade of our home hardware status.

(You may recall the captain was the subject of my column last February on the needs for "houseware" and "spouseware" in the home. And, although I appreciate why many readers felt I had conjured up this whimsical character, he actually is alive and well and practicing his pastimes in Bethesda, Md.)

"Now, now, captain," I countered. "The computer industry has spent a lot of energy and money researching the consumer marketplace. Surely it knows what it's doing."

"Balderdash!" he retorted as he reached into a large pile of of catalogs, fliers, magazines and newspaper clippings and brought forth the new Heathkit catalog.

"Listen to this travesty from page four: 'The Heathkit H8 computer ... the powerful, easy-to-use hobbyist's computer with the intelligent front panel featuring an *octol* entry keyboard.' What in the world is so easy about octal? I thought machine language coding went out of style with the 850.

"And it's over $350!" he continued.

"Listen to this sweet passage: 'Designed with features for the beginner . . . systems software includes Benton Harbor Basic (tm), HASL-8 (tm), 2-pass absolute assembler for creating efficient programs," etc. 'Beginner,' my foot, unless they mean one who has a graduate degree in computer science plus a minimum of 10 years of DP experience but is beginning to downgrade some IBM 370/168 programs for a micro-folly."

"But, captain," I stammered as I leafed through the catalog, "the computer advertising copy doesn't seem to be much more complicated than the copy for the more conventional items."

"You forget one thing, dear friend. Although I have constructed at least one item from nearly every product class in this catalog, it took years to get the hang of it all. Now your industry seeks to dump it all on us in one fell swoop. The classic hobbyist simply can't handle the peak training load," he said.

Fortunately the subject was changed when his wife, Roberta, stopped to chat. "Robbie, what's it feel like to live in an electronic jungle?" I inquired.

"Well, those little black boxes do take up a lot of room, but I dust around them.'

The Human Connection

"That doesn't sound as if you're very deep into the mysteries of electronics."

"Well, I wouldn't put it quite that way. Grif bought me one of those $7.95 calculators for my birthday," she said, "but I think it's a lemon.

"First of all, the numbers are all in the wrong place. The 1,2, and 3 are on the bottom row and 7,8 and 9 are at the top — just the opposite of the telephone. Then the arithmetic keys are upside down: Divide is at the top and Plus is at the bottom. Everyone knows we learn to add first, divide last.

"And the calculator is missing some way for me to record my numbers. It needs a printer. As it is now, when I balance my checkbook I have no way of knowing if I make a mistake. So I've gone back to paper and pencil."

"Robbie, I know you're a whiz at gourmet cooking," I said, changing the subject again. "Have you heard of the home computer that retrieves your favorite recipe almost instantly?"

"Grif showed me a picture of an electronic machine that would do that. But, by the time I figured out the knobs and switches, I'm sure we would starve to death."

Later in the week, Robbie called. "Jack, I've found a perfect Christmas present for Grif. The Panasonic Compact Microwave Oven — feather-touch control, food temperature probe, cooking function programmability, six power settings, digital clock and woodgrain finish. What do you think?"

"Sounds good to me," I replied.

The next day, the captain telephoned. "Stone, would you believe I have the neatest present for Roberta? I stumbled on it at Neiman-Marcus. It's the Micro Home Computer. Listen to this! The basic system includes a 16-line TV monitor, twin data storage cassette drives, CPU with four I/O ports and 26K of main memory. Only 4Gs. Do you think she'll like it?"

I told him she'd adore it.

HAPPY HOLIDAYS!

Letters to Stone should be oddressed to him ot Suite 222, 2233 Wisconsin Ave. N.W., Woshington, D.C. 20007.

Marketing Proves the Problem

Overdraft Protection Real —But Profitable?

The Taylor Report
By Alan Taylor CDP

In my Nov. 21 column, I described one particular check-protection scheme in which a bank automatically transferred a sum of money into a checking account to cover overdrafts. I mentioned this "installment loan" type of method was like many other such options provided around the country.

Shortly after that column appeared, I received a letter from Donald Hollis, a vice-president at the Chase Manhattan Bank, telling me about his bank's system. This system — the "English overdraft" approach — is significantly different and, as far as I can see, significantly better than the "installment loan" approach I described earlier.

There is, however, a problem with the English overdraft method, and it arises from its use of computers.

The English Method

In the English overdraft approach, the checks that might be bounced get paid, just as in the installment method. However, the bank does not set up a special installment loan account; instead it simply carries forward the true account balance, even though it may be in the red.

As further transactions come in, the account continues to show its true balance, which fluctuates day by day. The computer keeps track of the number of dollar/days of overdraft and charges interest at the agreed rate on the overdraft, just as other systems calculate interest using the number of dollar/days of balance in interest-bearing accounts.

The difference, from a consumer's point of view, is that he is charged interest only on the actual amount he is overdrawn — not a cent more. This is significantly less than being charged for overdraft-triggered installment loans, which both extend the time in the calculation and increase the amount upon which interest is being charged, although the actual amount in the bank's coffers — the amount earning interest for the bank — is exactly the same.

Hollis told me Chase adopted the English method because it seemed to really reflect the label that is put on the service, "Overdraft Protection," and because it is properly packaging the service in computer terms, instead of simply continuing the computer era methods used in tab days.

Comparing the computer vs. the tab eras is a good analogy of the two services. In the installment loan method, the tab cost of computing interest on the daily overdrawn balance is simply too high to employ the standard daily interest overdraft situation used worldwide for large overdrafts, such as corporate overdrafts, national debts, etc.

The introduction of the computer made all this computation an easy part of normal processing, and Chase has passed the savings on, giving people the best of the situation. It also has normal installment loans for people who want the discipline of paying them back on a regular basis, but so far it has does not have a combined overdraft-triggered, periodic payback system, which may be wanted.

I, for one, am very pleased with the approach Chase has taken. I understand it still has a problem with the approach, however, because it is not too easy to sell the computer era system against the tab era approach its competitors are profitably marketing under what appears to be the same label.

I not only understand this, but see a computer community interest in finding some sort of solution to the matter. A computer era answer to a situation will almost always be more difficult to explain than a quill pen effort.

When system design advantages are being held back because of confusion with earlier systems, it is time for all of us to consider how to face up to the problem.

How do you think you would market this real overdraft protection in competition with the installment loan selling gambit sold under the cover of overdraft protection? I'd be interested to hear.

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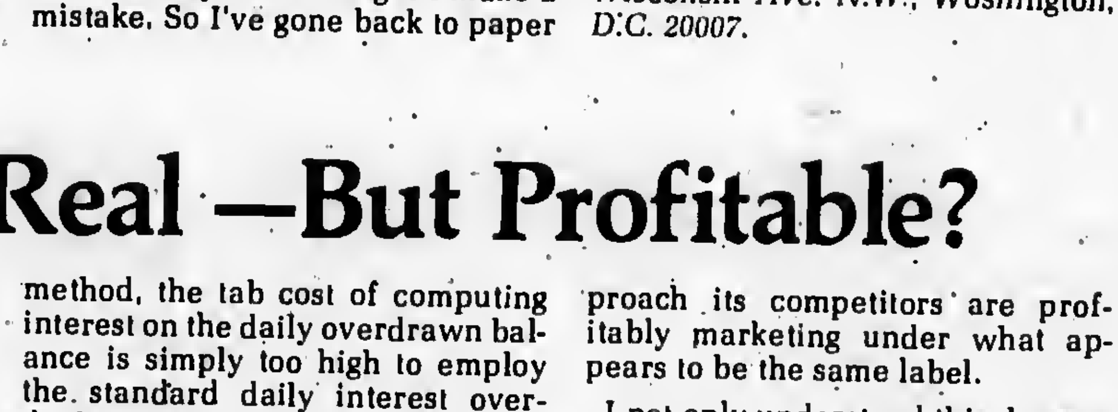

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Utility Sorts 360/370 Tapes on Mini

OCEANPORT, N.J. — The possibility that an IBM 360/370 installation can off-load much of its sorting work onto a smaller machine has come closer to reality with the introduction of Sort/Merge II by Interdata, Inc.

The utility runs on Interdata's 32-bit CPUs and handles tapes or disks generated on any of the company's peripherals. But it also handles magnetic tapes with IBM or American National Standard labeling and blocked records and accepts Ascii or Ebcdic data, so it could complement the mainframe work, a spokesman noted.

The reality of moving all sorting to the smaller machine is currently limited, however, by Sort/Merge II's inability to handle anything but fixed-length records and the Interdata equipment's inability to accept IBM-style disk packs.

In its basic operation, the package is "well suited to users of large data file applications requiring high performance" because the Interdata 32-bit architecture permits in-core work spaces of up to 1M byte, the spokesman claimed.

Sort/Merge II has overcome many of the limitations of its predecessor. The enhanced version, for example, accepts an unlimited number of keys in mixed sequence including computational, display, packed decimal and floating-point fields.

The package handles multiple files, with a theoretical maximum of 256 multireel files as input to a sort run and as many as four files for merging, the spokesman continued. Block Sizes are essentially unlimited, but individual records cannot exceed 4K characters, he said.

A user exit is provided to allow installation-specified handling of identical key situations. Alternatively, the user may default to Sort/Merge II's standard technique for resolving that problem.

Other features of the package include dynamic error correction and recovery mechanisms; automatic multivolume and interfile prompting; interactive and batch command input modes; and automatic scratch file allocation.

The utility requires Interdata's Dynamic OS/32 MT operating system [CW, Sept. 26] and 15K bytes of main memory. It costs $1,000 and is available now from Interdata at 2 Crescent Place, Oceanport, N.J. 07757.

According to BAI Survey

Most Banks Question DDP Trade-Offs

By Don Leavitt
CW Staff

PARK RIDGE, Ill. — A "very limited" number of banks are involved in true distributed data processing (DDP). But other bankers are "eagerly drawing up their own score cards" to decide when and how to move into DDP, according to a report the Bank Administration Institute (BAI) will soon release.

Despite the interest shown by some banks, however, about one-third of those responding to the institute's questionnaire indicated they have no plans to use DDP in the future, the report showed.

The report summarizes a survey started by the institute last spring to determine the extent to which DDP is being used in the banking industry. The BAI also wanted to learn how DDP is being used and what applications are most frequently developed in a DDP environment.

The questionnaires were sent to 486 banks and responses were received from 205. Ninety-seven of those banks are not using DDP now and 74 of those won't be moving in that direction, the institute found.

For purposes of the survey, DDP systems were defined as those having computing power in two or more locations that are connected at least part of the time. Not included were systems that use only nonintelligent terminals for simple inquiry, remote data capture or printing functions.

The institute tallied responses by system architecture, identifying "single mainframe" systems with one CPU connected to minicomputers or intelligent terminals and "multiple mainframe" systems with several CPUs (which may be minis) connected at least part of the time.

The study also broke out "geographically distributed" systems in which the DP system's computing power is distributed over two or more physically operational locations. Many of the reporting banks used or planned to use all three types of configuration, BAI noted.

Traditional Applications

When asked which applications they currently had installed in a DDP setting, the banks reported that traditional functions predominate and are about equally divided among the various types of systems architecture. Central Information File (CIF) applications are the major exceptions; most of them are installed on single mainframe configurations.

CIF was at the top of the list, regardless of the configuration, when BAI asked the banks what applications they plan to develop on a DDP system. The traditional banking applications fell in a cluster not far behind CIF, again with little distinction between the types of hardware systems.

When it explored the organization of data bases to support the applications, the institute found — "not surprisingly" — that centralized bases are still the most common.

In-house development of application systems is still the most popular approach. But, the report continued, "it is interesting to note" the large number of application systems purchased from outside the bank.

Responses to the question of who designed the DDP system illustrated the large role played by vendors, according to BAI.

Although in-house personnel were credited with 66 of the systems, "vendors helped" on another 66, "consultants helped" with 14 more and seven were designed "primarily" by consultants or vendors.

Credits and Debits

At the end of the questionnaire, the bankers were asked to list the advantages of DDP in order of importance, followed by the disadvantages.

For many of the banks, cost effectiveness is the primary advantage of DDP. For many others, the absence of cost effectiveness is the primary disadvantage, BAI reported.

The report is expected to be released sometime this month, according to David Van L. Taylor, principal systems specialist at BAI headquarters, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

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For File Updates

'LKM' Builds Cobol Code

CHARLOTTE, N.C. – The "sticky problem" of coding a Cobol program to update a master file from current transactions can be handled without any conventional coding by an installation using the Low Key Maintenance (LKM) package from Pesa.

LKM generates ANS Cobol source code based on series of parameter cards prepared by the user. Although the package output is structured according to a predefined set of rules, those rules can be altered by the user to make the output conform to local standards, a spokesman noted.

The generated code copes with the addition, change or deletion of individual fields or whole records in a master file. The program structure processes a single transaction file against a single master file with no other output, he explained.

The master file may have a sequential, indexed sequential or direct access organization and the transactions can come from cards, tape, disk or CRT screen.

The master file can be made up of "any number" of different record formats, but the record length in any given file is fixed even if various formats are used within the file, the spokesman added.

Since a source program is created, the user has an opportunity to add code to it before submitting it for compilation. By combining the mainline generated by LKM with other logic, the program can be as complex as needed without a great deal of effort, he claimed.

LKM is distributed in object code, but can be used on any CPU that supports ANS Cobol and has 64K memory available to the package. It costs $3,200, including documentation and training aids, and can be ordered from Pesa, 6400 Sheppard, Charlotte, N.C. 28211.

'Structured' Sessions Set

NEW YORK – Scheduled for eight cities in January, the one-day "structured caravan" planned by Structured Methods, Inc. includes both addresses and clinics on various aspects of the system development life cycle.

The sessions will be held in Washington, D.C., on Jan. 5; Toronto on Jan. 9; Chicago on Jan. 11; San Francisco on the 13th; Los Angeles on the 16th; Houston on the 18th; Boston on the 20th; and in New York on Jan.23.

The fee at each session is $50 and attendance will be limited.

Bank Services Backed by CSG

MISSISSAUGA, Ont. – Contact, an on-line banking service from Canada Systems Group (CSG), combines intelligent terminals with software on CSG's IBM 370/168s here. The nucleus of the service is a Customer Information File (CIF) which allows a user to access a complete profile of its customer base, a spokesman said.

CIF provides retrieval and maintenance of interrelationships without manual intervention. Access to the CIF can be by account number or name, which means families of accounts can be consolidated even without a common numbering system, he explained.

Linked to contact are application programs to handle savings and checking accounts, personal and commercial loans, term deposits and other bank services and to permit automatic funds transfer between accounts. The system provides a wide range of statistical and control reports and its general ledger subsystem can interface with other CSG services, the spokesman added.

The teller terminal subsystem utilizes Incoterm terminals and supports 42 types of transactions. Displays on the CRT may include 36 separate control totals or, the teller's cash position.

Terminal Choices

Selection of the terminal equipment to be used would be a joint effort of the user, Incoterm and CSG with final contracting between the user and Incoterm, the spokesman noted. The cost of adapting a user's operations to Contact would be negotiable, he added.

The cost of using Contact is based on time used when browsing through the CIF and on the number of accounts and number of transactions handled when processing the work.

While CSG has facilities available coast-to-coast in Canada, they can also be accessed by U.S. banks, he said.

CSG is headquartered at 2599 Speakman Drive, Mississauga, Ont. L5K 1B1, Canada.

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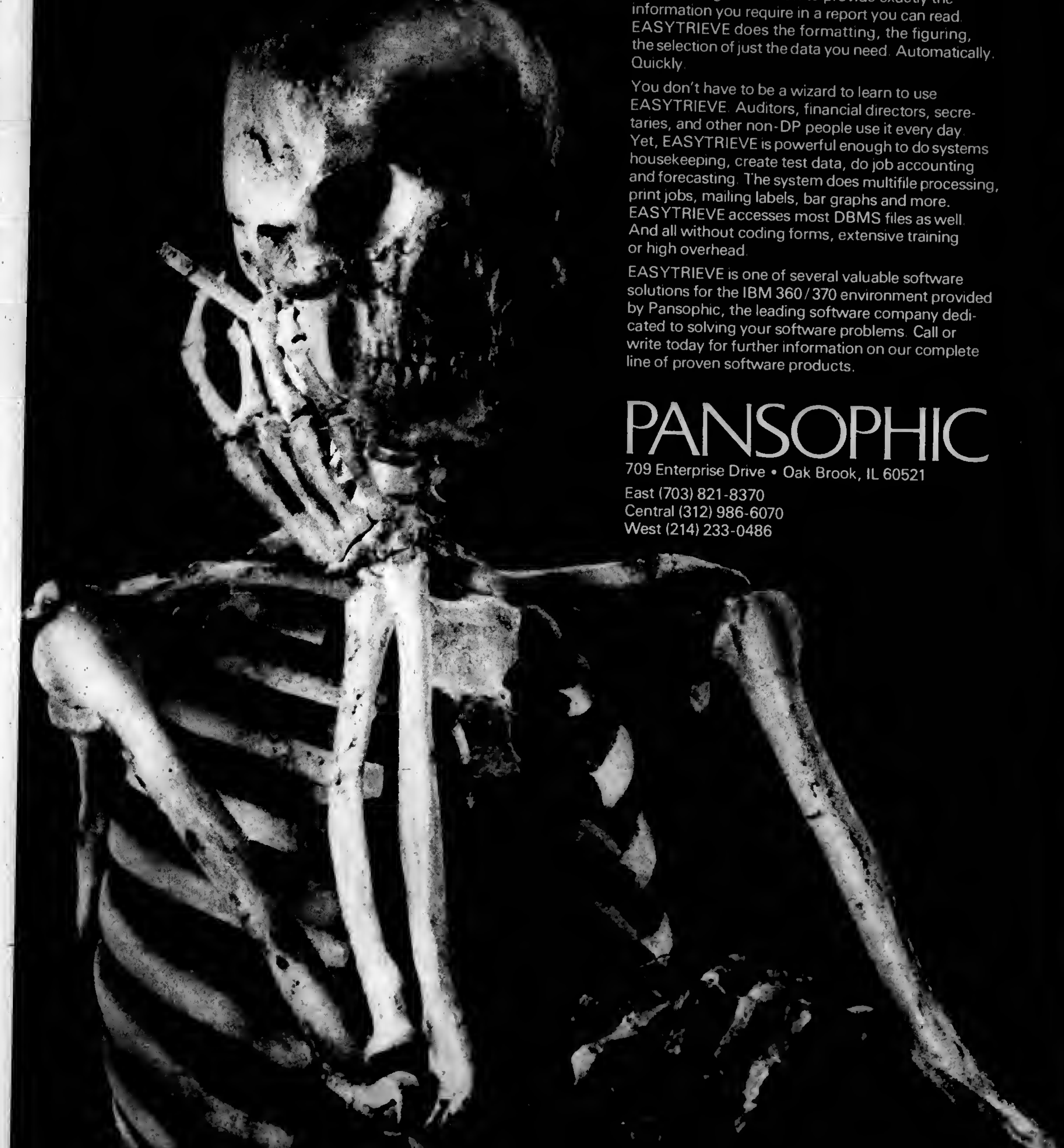

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RPG Standard Needed?

TORONTO — The Canadian Standards Association (CSA) has scheduled a Jan. 19 organizational meeting of people willing to participate in the development of a standard for RPG-II. It will be held at CSA headquarters in Rexdale.

The proposed committee is not necessarily limited to Canadians, a spokesman added. Sponsored by the CSA Committee on Programming Languages, the meeting is open to hardware and software suppliers, users and other concerned people.

Anyone interested in the project is asked to contact committee secretary H.Z. Rogers at CSA, 178 Rexdale Blvd., Rexdale, Ontario M9W 1R3 Canada.

On ADP Network

'Tstudy' Analyzes Activity Data

MINNETONKA, Minn. — Cyclical time study data recorded on the Datamyte 900 can be processed rapidly and at low cost through the Tstudy program on the ADP Network Services time-sharing system, according to Electro/General Corp., which developed both the Datamyte and Tstudy.

The Datamyte 900 is a battery-powered data collector with a keyboard, an internal clock for time-stamping entries (at one-tenth of a minute intervals) and a 32,000-character memory for storing them before they are processed, a spokesman explained.

The Datamyte 900 includes a pad of paper for quick calculations.

Intended primarily for monitoring industrial production operations, the unit can be used anywhere but must be cabled to a time-sharing terminal to transmit the data to ADP for analysis by Tstudy.

Written in Basic, the program generates a three-part report in minutes, he claimed, rather than the hours or days a comparable manual workup might require.

Three Summaries

The report includes an "element summary" showing average, minimum, maximum and leveled element times plus total cycle average time and leveled time.

Rating factors are also shown, the spokesman added.

An "allowance summary" shows shift delays and allowance times. Foreign elements may be excluded.

The "final summary" section shows allowed time cycle per piece, production rate per hour and per shift (including delays) and standard time.

The Datamyte 900 is available from Electro/General for $2,490 or $125/mo. Use of Tstudy is at normal ADP rates, without initiation fee or monthly minimums, the company said from 14960 Minnetonka Industrial Road, Minnetonka, Minn. 55343.

Data 100 Adds RPG II, Sort/Merge

MINNEAPOLIS — Data 100 Corp. has added RPG-II and disk-based sort/merge utility to its Model 74 Keybatch and Model 78 remote-processing systems, according to a spokesman.

The RPG-II is tailored to the system on which it is to be used, but each version supports data communications capabilities compatible with IBM 2780 and 3780 line protocols, he said.

The Model 74 implementation of RPG-II supports Keybatch disk files while the packaging for the Model 78 supports sequential, indexed and direct access and keybatch files.

The availability of a programming language for these machines means that users now have more extensive editing facilities and logical operations that "just weren't available to them before," he said.

The sort/merge capability, which sorts disk files and utilizes the disk for workspace, is used with either RPG-II version. A special feature allows Keybatch files to be sorted as groups of records for document sorting.

There is a $50 one-time installation fee for either of the RPG-IIs and a similar start-up cost for the sort/-merge. After that, monthly maintenance fees of $25 apply for each package, Data 100 said from 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

'Amaps' Moved to HP-3000

MINNEAPOLIS — Comserv Corp. has adapted its manufacturing, accounting and production system, Amaps, to run on the Hewlett-Packard Co. 3000 and Amaps/3000 is available now, according to the company.

The package provides an integrated on-line, closed-loop, net-change system which contains nine modules supporting different aspects of the manufacturing process. A bill of materials module is the basis of the entire system, a spokesman said.

Beyond that, however, Amaps/3000 includes a material control subsystem, a master scheduling module and support for material requirements planning well as purchasing. Control of routings and work centers and shop floor control are still other modules in the system, he said.

Subsystems for capacity requirements planning and standard costing complete the list of modules that make up Amaps/3000.

This implementation of Amaps is written in Cobol and utilizes the Image data base management system offered by HP.

While individual modules are available, the system is typically installed in logical groups of two or three modules each, at $45,000 per group. However, discounts apply for users acquiring the whole system, Comserv said from 3050 Metro Drive, Minneapolis, Minn. 55420.

'Analyzer' Options Include Graphics

MONTVALE N.J. — Program Products, Inc. now has, as a separate cost option for its Data Analyzer [CW, Nov. 28] a series of macro instructions designed for graphic applications utilizing a conventional line printer.

The Graph-I option is said to be capable of producing graphic output either by itself or in conjunction with output from other reporting facilities.

Graph-I costs $4,000 in addition to the license fee for the appropriate Analyzer, the spokesman added from 95 Chestnut Ridge Road, Montvale, N.J. 07645.

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Installed for Credit Checking

Store Chain Mixes Terminals in IBM Net

By Ronald A. Frank
CW Staff

ATLANTA — Rich's department store chain has installed an IBM 3650 retail point-of-sale (POS) terminal system to check customer credit and provide sales data to the firm's 370/155 mainframe here.

In addition to IBM terminals, the company utilizes TRW credit pads, NCR Corp 280 POS terminals and Regitel POS terminals, according to Miles Wilson, vice-president of management information systems.

The variety of terminals are in operation at Rich's and Richway discount stores and transmit transaction data to the chain's DP center here over a four-wire private line network.

The credit authorization messages from IBM 3653 retail terminals are transmitted to an IBM 3705 that serves as a front end to the CPU. The 3705 utilizes an IBM software package known as Path as part of its Network Control Program.

The Path software detects credit messages sent to the 3705 by Model 3651 in-store controllers and sends them to an IBM System 7 that handles "first-level credit functions."

The non-IBM terminals in the Rich's network transmit their credit inquiries directly to the System 7 because they use protocols that are not compatible with the 3705. Although the use of the System 7 is somewhat unusual for this type of application, it allowed the non-IBM terminals already installed to function in the same network as the IBM terminals, according to an IBM spokesman.

The Rich's stores have Model 3653 terminals installed at points on the sales floor. The terminals are connected to the 3651 in-store controllers using Synchronous Data Link Control (SDLC) loop architecture. Several loops may be configured in an individual store depending on the number of terminals in operation.

The IBM controllers are polled by the 3705 front end and their messages are transmitted at 2,400 bit/sec to the DP center using Bell modems. The TRW, NCR and Regitel terminals transmit data at 1,200 bit/sec to the System 7 using Intertel modems.

When sales and payment method information is entered into a 3653 terminal, the 370/155 authorizes the transaction or advises the sales clerk to call a store credit office. Transactions are entered into the system either from the terminal's keyboard or by using a wand that "reads" sales information encoded in a thin magnetic stripe on the price tags.

The terminal records the inventory infor-

(Continued on Page 30)

SNA, Programmable Subsystem Enhance IBM Series/1 Mini

ATLANTA — IBM has introduced communications enhancements for the Series/1 minicomputer that include a programmable communications subsystem and Systems Network Architecture (SNA) capability.

The Model 4987 programmable communications subsystem includes a hardware unit that allows line attachment via external modems in synchronous or asynchronous transmission modes at speeds up to 9,600 bit/sec, IBM said,.

Program-selectable features include switched or nonswitched compatibility, handling of 5-, 6-, 7- or 8 bit/char., internal or external clocking, parity and other check features.

A communications-oriented instruction set allows for protocol handling, control character generation and recognition, autopolling of multipoint lines, error retry functions and similar capabilities, a spokesman said.

A hand-held communications console, the Model 4990, is used with the 4987 for program debug and determination.

Software with the subsystem includes a macro library to support the generation of controller storage image programs. This programmable subsystem preparation facility allows the user to define and customize the protocol for the subsystem, IBM said.

An execution support package is also available that runs under the Real-Time Programming System versions 2, 3 and 4. This software includes a loader and macros to support the 4987.

Version 4 of the Real-Time Programming System includes the SNA capability that enables the Series/1 to operate with a 370 CPU and a 370X in Synchronous Data Link Control (SDLC) networks. Version 4 can be used in conjunction with ACF/Vtam or ACF/Tcam networks with the 370 running under OS/VS2, SVS or MVS, IBM said.

The licensed software is available for $2,250 or $38/mo with first availability scheduled for May 1979. A typical "fully configured" 4987 subsystem with 32 synchronous and asynchronous lines at 1,200 bit/sec including the controller costs about $14,800.

Job Market Bullish

NEW YORK — Severe skill shortages have been reported in several telecommunications areas, according to an annual survey of communications jobs conducted by Personnel Resources International, Inc. here.,

During the first nine months of 1977, no major layoffs occurred and most of those entering the telecommunications job market "encountered little difficulty in finding employment," the survey showed.

Most starting salaries in telecommunications ranged from $15,000 to $27,000. The nationwide average for a consultant analyst with some data communications experience ranged from $18,000 to $23,000, the surveyers found.

Senior telecommunications programmers with systems experience had salaries ranging from $17,000 to $21,000, while message-switching programmers earned $14,000 to $18,000.

The salaries of DP operations managers with real-time systems experience ranged from $19,000 to $23,000. Junior-level consultants in telecommunications earned $13,000 to $18,000. Salaries in all categories were slightly higher in the New York area, the surveyers noted.

Copies of the survey are available free from Personnel Resources, Suite 1234, 342 Madison Ave., New York, N.Y. 10017.

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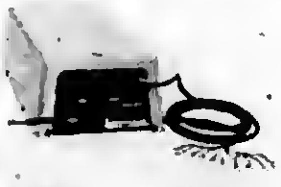

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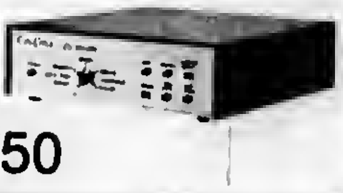

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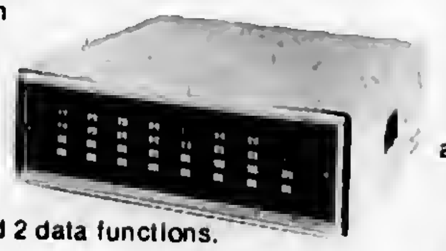

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Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

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And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take delivery in just 30 days.

Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
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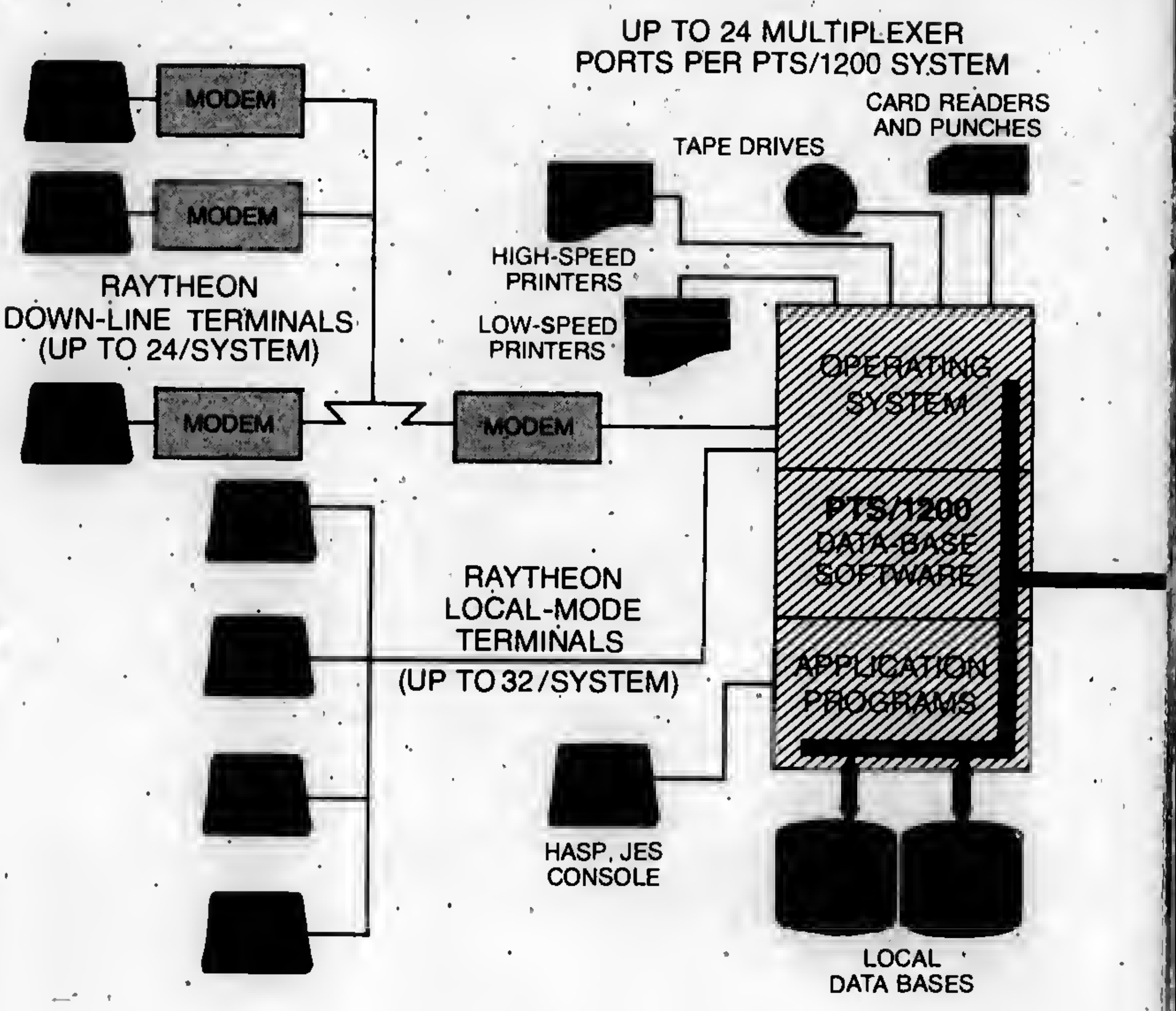
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

Consider these five benefits, and you'll look a lot harder at the PTS/1200:



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The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.

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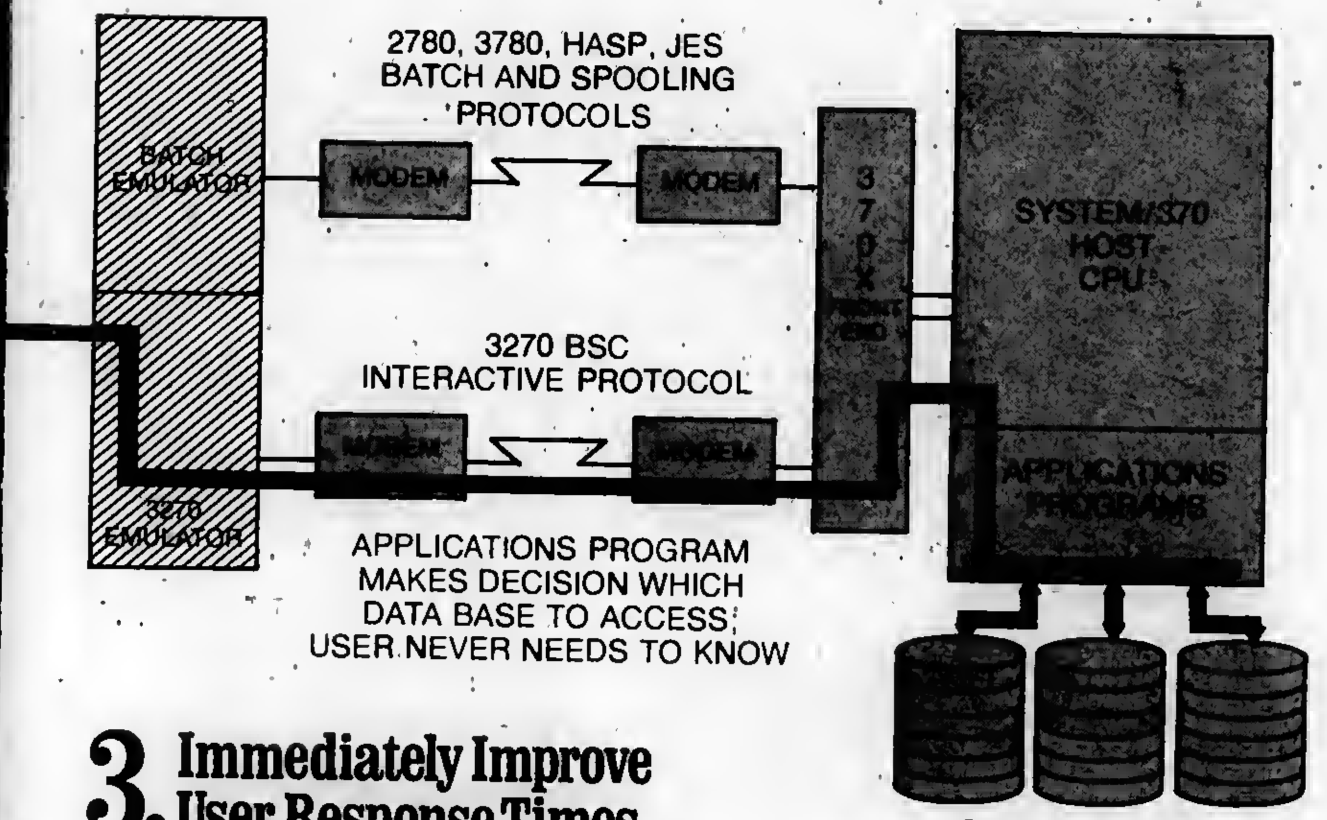
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CRTs Linked to Boston CPU

City Hall Hookup Speeds TV Election Returns

BOSTON — WNAC-TV reportedly provided election returns an hour earlier than competing area television stations on the recent Election Day by using a terminal-based election return system.

The programmable terminal system was used to access and display the returns. The system included two CRT terminals, one on the anchor desk and the other off-camera, which were used several times each hour during WNAC's two-minute election updates and during the 11 p.m. news broadcast.

The system, using a processor with 32K memory, was connected via private phone lines directly to the City Election Commission's IBM 370/158 mainframe located at Boston City Hall, which tabulated voting returns.

While on the air, WNAC reporters used a terminal to request current tabulations in one race, while the second terminal simultaneously accessed results from another race.

As a result, the station reportedly was able to display election returns within a few seconds after the data was entered into the host by the city's Election Department.

During previous elections, WNAC stationed reporters at City Hall to phone in figures as they were posted on video monitors. There was at least a 15-minute delay from the time the results were posted in City Hall, across the street from WNAC-TV, until they were aired, a station spokesman said.

Quick Installation

One week before Election Day, the station contacted six vendors to install a system. IBM and Raytheon Data Systems were the only two companies able to respond.

"IBM told us we'd have to wait a year for a terminal, even though I explained that the election was next week," the WNAC spokesman said. "Within two days Raytheon had the system up and running."

Over that two-day period, a team of Raytheon engineers established the link with the city's mainframe, installed the terminals on the newsroom set and trained the reporters on the system.

WNAC-TV used programmable terminals for election returns.

The Election Commission's computer system was programmed with five formats to tabulate the returns. With only six keystrokes, the newsroom had access to the latest city council, school committee and referendum question results. One format provided a summary of which of the city's 252 precincts were counted.

LA36 Made Interactive

CHARLOTTE, N.C. — Datasouth Computer Corp. has introduced a kit to convert a Digital Equipment Corp. LA36 300 bit/sec teleprinter to a 1,200 bit/sec interactive terminal.

Called the DS120, the kit features a circuit board designed around a third-generation microprocessor that provides the control logic required to upgrade the LA36, Datasouth said. The board replaces the standard LA36 card and is said to be 100% plug-compatible with the existing electronics.

Among the improvements will be bidirectional printing at 165 char./sec under control of the microprocessor, according to a spokesman. The carriage movement will be optimized to automatically tab over white space and print in reverse to save carriage-return time, allowing sustained operation at 1,200 bit/sec, he claimed.

In addition to the enhancement of the printer performance, the microprocessor controls features for forms handling and interactive communications, he added.

Standard features are said to include an EIA interface, horizontal and vertical tabs, top-of-form, Bell 202 compatibility, X-on/X-off protocol, 110- to 9,600 bit/sec line operation, double-wide characters, parity selection and error detection and self-test mode.

The DS120 costs $885 and will be available in January from Datasouth at 122 W. Woodlawn Road, Charlotte, N.C. 28210.

HP Unit Converts Outputs For High-Resolution CRT

PALO ALTO, Calif — The Hewlett-Packard Co. Model 1350A graphics translator converts outputs from digital systems to analog outputs to drive high-resolution CRT displays. It provides "soft copy" graphics so the user can check and modify his output before making a hard copy, according to the firm.

The Model 1350A was developed for engineering design, statistics, medicine, numerical control and similar applications.

With the Model 1350A, designers can see the effects of changes before recording results permanently, scale factors of plots can be adjusted before obtaining hard copy and circuit changes can be made on the CRT without having to redraw entire diagrams, HP said.

Digital information from the HP Interface Bus (HP's implementation of IEEE 488) or an optional RS-232C interface bus is stored in a 2K random-access memory. Vectors and/or characters are generated by accessing the memory, which is capable of driving several CRT displays, HP said.

The memory can be divided into 32 independent files, which allows the files to present different information to separate displays. The 32 files are selectable in size, addressable and selectively eraseable; they can be flashed on and off for highlighting information of interest, HP said.

The translator is recommended for use with directed beam displays with at least 2 MHz bandwidth to take advantage of the 1350's high-speed vector generating capability.

The Model 1350A costs $3,450. HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Net Handles Terminal Mix

(Continued from Page 27)

mation describing each item purchased and displays prices on a lighted panel. It then computes amount due, including applicable taxes, calculates the change to be returned to the customer and prints a cash receipt and a journal tape.

All transactions are automatically transmitted from terminals to the in-store controller which, working with the 370 CPU, processes sales activities for balance of store inventories.

Nearly 800 terminals are installed in 11 Rich's department stores and 14 Richway discount stores in Atlanta area, Birmingham, Ala., Charlotte, N.C. and Columbia, S.C.

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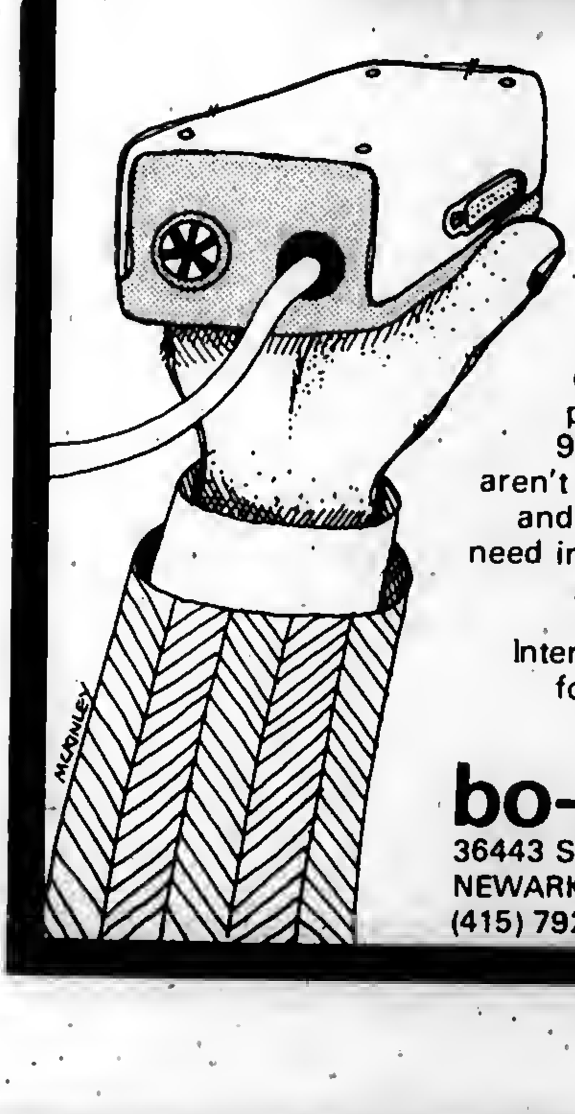

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Terminal Transactions

Delta Data Adds CRT Featuring MPU Control

CORNWELLS HEIGHTS, Pa. — Delta Data Systems Corp. has introduced a CRT terminal that utilizes a Texas Instruments, Inc. TMS9900 microprocessor.

The standard Delta 7000 has 16K bytes of directly addressable memory, which includes an 8K programmable read-only memory for terminal control and an 8K random-access memory for function keys, dot tables and buffer.

The terminal can display 25 lines by 80 characters of data using editing features which include insert/delete, cursor addressability and paging up and down, Delta said.

Characters are displayed in a 7 by 9 dot matrix on a 10 by 12 field with all dots displayable and programmable, the firm said. The basic 124-character Ascii code set is used along with line drawing graphics.

Blinking, underlining and split-screen capabilities are available on the 7000, a spokesman noted.

The standard terminal can operate in both asynchronous and synchronous modes at data rates from 75- to 9,600 bit/sec. Teletypewriter transmission mode is standard, but software is available for the 7000 to operate in IBM 3270 compatible mode, according to the spokesman.

Provision has been made to incorporate bit-oriented protocols such as Synchronous Data Link Control (SDLC), he said.

Up to 6,000 characters of text can be stored and various fonts can be generated under software control for text-editing operations. Data entry applications using a floppy disk multistation configuration are available with the 7000 using IBM emulation, the firm said.

The terminal can be programmed in both Assembly and higher level languages such as Fortran and Basic. The 27th line of the screen is used to display message and status data.

The basic terminal costs $3,500 from Delta Data at Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

Display From Micro-Term Give Full Data Management

ST. LOUIS — Two CRT terminals that reportedly feature auto scrolling and have complete data management capabilities at data rates of up to 19.2 kbit/sec have been announced by Micro-Term, Inc.

The Act-I can communicate with any CPU that supports a serial Ascii I/O channel, according to a spokesman. Its CRT screen has a 64-character by 16-line capacity composed of upper case alphanumerics, he added.

Lower case transmission is possible by removing a specially labeled jumper within the Act-I, he noted. Data rates are switch selectable via a control on the rear cabinet.

Features include an automatic carriage return, a screen-clearing key and an independently formatted display that prevents overfilling of a line.

The Act-IV has a full screen display of 24 lines by 80 characters, which include all of the 96 upper/lower case symbols and a set of 32 additional characters that can be displayed upon command.The Act-IV can operate in either full- or half-duplex mode.

The Act-IV also features two types of operation, character/remote and page/local modes. With the first, character transmission occurs with each keystroke. In the latter mode, all keystrokes are acted upon and displayed locally, but no transmission occurs until the Send key is depressed.

A printer port allows the unit to supplement, rather than replace, hardcopy terminals, the spokesman said.

The Act-I is priced at $400 without a monitor. An optional 9-in. monitor costs $130. Cursor circuitry for the Act-I is priced at $50.

The Act-IV, without monitor, is priced at $550. With a 12-in. monitor and keyboard contained in the same cabinet, the cost is $800. The firm can be reached at P.O. Box 9387, St. Louis, Mo. 63117.

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THE END OF THE LINE FOR INTELLIGENT TERMINALS.

Wang's PCS-II. The small business computer that makes intelligent terminals obsolete. And introduces a whole new world of Distributed Data Processing.

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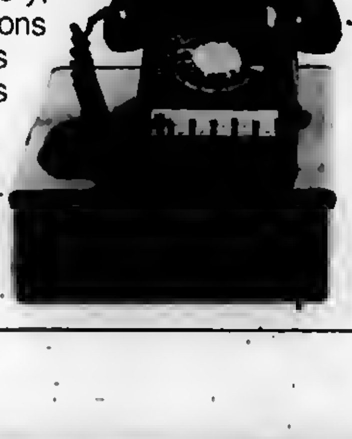
Hungry for more intelligence? Call your local Wang office or mail this coupon to PCS-II Product Sales, Dept. DDP, Wang Laboratories, Inc., One Industrial Ave., Lowell, Massachusetts 01851.



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Bits & Pieces

Report Gives Details Of Micrographic Systems

SILVER SPRING, Md. — Two reports, one of which describes the configuration and capabilities of 41 micrographic retrieval systems marketed today by 21 companies, have been issued by the National Micrographics Association (NMA).

"Automated Micrographic Retrieval Systems" is written in a chart format that outlines, for each system, the type of microform handled, capacity, access time, coding and indexing, search mode, output and special features and options, according to a spokesman. Information for this report was provided by the vendors, he noted.

The report, catalogued No. RR10, is available for $3.50 to NMA members and $5 to nonmembers.

"Micrographics Standards and Related Items," No. RR1, lists the standards of the NMA, American National Standards Institute, the International Organization for Standardization and others as of October 1977. It is available for $2 to NMA members and $3 to nonmembers.

Both resource reports can be obtained from the NMA, Publication Sales Department, 8728 Colesville Road, Silver Spring, Md. 20910.

Remote Journal Printer Handles Eight Terminals

BEDFORD, Mass. — The Concord Computing Corp. has introduced a remote journal and administrative printer that can maintain a continuous, consolidated printed record of all transactions made on up to eight of the firm's terminals, according to a spokesman.

The Model 700 produces 128 Ascii alphanumerics (three lines) per second on aluminized paper that is retained in a locked compartment for security, the spokesman stated.

The printer incorporates a Rockwell International PPS-4 microprocessor containing 4K of read-only memory, the firm said.

The printer is priced at $1,600. Concord Computing is at 7 Alfred Circle, Bedford, Mass. 01730.

Voltage Regulators Featured

BRISTOL, Conn. — The Superior Electric Co. has expanded its SVR series with four automatic voltage regulators that reportedly have zero waveform distortion.

The Stabiline regulators feature an efficiency of 95% at 60H and a correction rate of .5 cycle per 7V step.

Prices range from $275 to $695. Superior is at 383 Middle St., Bristol, Conn. 06010.

Intel Brings Out Add-Ons For Series 30, Some 370s

SUNNYVALE, Calif. — Intel Memory Systems has announced add-on memories it said are compatible with the IBM 30 series CPU and the IBM 370/135 through 148.

The In-7730 is hardware- and software-compatible with any of the IBM 30 series processors through use of an interface card set, the firm said. The interface unit reportedly converts the logic levels for the address, data and controls of the Intel system for the IBM CPU.

Intel's 2147, a 4K- by 1-bit static random-access memory (RAM), is the basic storage element in the In-7730, a spokesman said. The memory system can utilize IBM's single-bit error correction and double-bit error detection logic; its speed matches that of the 30 series CPU, he claimed.

Reconfiguration Panel

The unit also features a reconfiguration panel for memory usage should a malfunction occur and a power-down characteristic that provides low power dissipation when the device is not in use, the firm said.

The In-7730 can add up to 8M bytes of memory, depending on the CPU with which it is used. It is priced at $65,000 for 1M byte and leases for $1,650/mo.

The In-7700 memory adapts to the IBM 370 models with a change of interface cards, the spokesman said. The system interfaces directly to the CPU; like the In-7330, it also utilizes IBM error detection and correction logic.

Memory upgrades for the 370/135 and 145 are provided in 128K-byte increments up to a total system capacity of 512K and in 256K increments beyond that, according to the firm. Increments of 256K are standard for the 138 and 148 models.

Total memory for the In-7700 ranges from 128K bytes to 4M bytes, depending on the CPU to which it is attached and the amount of IBM memory installed, Intel said.

Purchase price for 256K of In-7700 memory for a 370/135 or 145 is $45,000; it can be leased for $1,120/mo. One megabyte of memory for a 138 or 148 costs $65,000 or $1,650/mo on a 48-mo lease.

Century Links CPU, Peripherals

DALLAS — Century Computer, Inc. has introduced a programmable controller that reportedly enables its line of computers to be interfaced to high-speed variable peripheral devices.

The microprocessor-based Programmable Peripheral Interface (PPI) presents a standard block-oriented channel structure to the operational software, a spokesman explained. The peripherals are controlled by standardized command blocks which use similar commands and have standard status responses, he added.

The microprogrammed control unit contains a 2K- by 48-bit read-only memory (ROM) that is expandable to 65K words and a 16-bit random-access memory (RAM) with an addressability up to 65K words, the firm stated.

The RAM is used primarily for buffering blocks to and from peripheral devices, error checking and retry operations, Century said. It possesses 88 instruction possibilities including arithmetic, logicals, literals, conditional jumps and byte operations.

The unit has an execution time of 220 nsec, the spokesman noted.

The PPI can connect four magnetic tape or cartridge disk units to the Century computer and has the capability to perform such tasks as searching for the disk file by key, writing and verifying sectors and performing other I/O operations, the firm said.

It can reportedly handle storage module disks up to 300M bytes each and cover a variety of tape speeds, bit densities and encoding formats.

The controller is priced at about $4,000. Century Computer is at 13500 Midway Road, Suite 208, Dallas, Texas 75240.

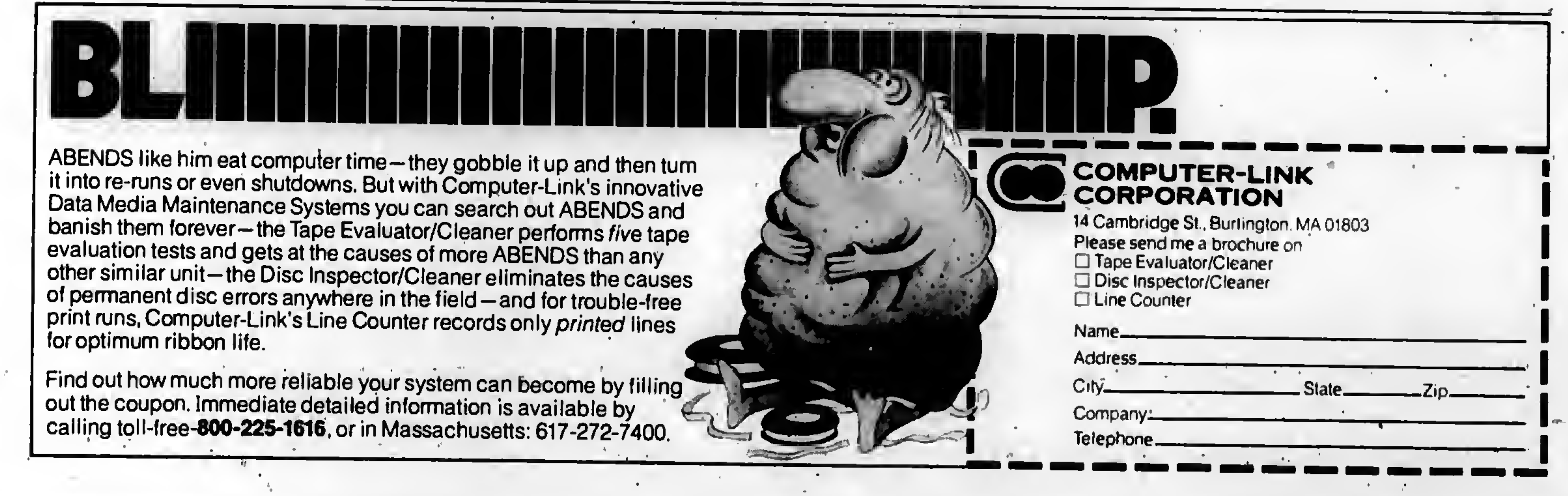
CMI Reduces 168 Memory

BEDFORD, Mass. — Cambridge Memories, Inc. (CMI) has reduced prices on its add-on memory system for the IBM 370/168 by a minimum of 9%.

A single million-byte module of 370/Stor 168 memory was reduced from $75,000 to $68,200 with a comparable drop in 12-, 24-, 36-, 48- and 60-month lease prices, the company said.

With the price reduction, the cost of the memory is approximately 38% below IBM's price for a similar sized unit, a spokesman stated. He attributed the price reduction in part to the availability of lower cost semiconductor memory chip components and "the desire to restore a maximum competitive advantage."

The reduced prices go in effect immediately, CMI said from 12 Crosby Drive, Bedford, Mass. 01730.



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REI Has Portable Unit For Reading OCR Labels

DALLAS — A portable optical character recognition (OCR) wand terminal that can automatically read machine-printed and human-readable information from tags and labels has been introduced by Recognition Equipment, Inc. (REI).

Hand-Held Reader

The Recognition 3400 includes a hand-held optical reader with a built-in keypad and LED display that allows merchandise identification codes and unit counts to be entered and displayed during data capture, REI said.

The keypad and display rotate, accommodating either left or right single-hand operation, a spokesman added.

Inventory Status

The unit is suited for automatic transaction and inventory status recording in locations not readily tied to a distributed data entry or DP system. It can be used for accounting operations, on-floor merchandise cycle counts and in distribution or store-to-store transfer operations, REI said.

The terminal costs approximately $3,300 with delivery scheduled for the first quarter of 1978. REI can be reached at P.O. Box 22307, Dallas, Texas 75222.

Intronics Adds Converters

NEWTON, Mass. — Intronics, Inc. has a series of power converters that can reportedly be used to power analog circuitry that must be isolated from digital circuitry using the same bus or battery.

The Series DCE converters provide about 15 Vdc and 150 mA outputs from 5-, 12-, 24- or 28 Vdc buses or batteries, a spokesman said.

Reduced Noise

Features include a reduced output noise level and a high attenuation input filter that is said to reduce kickback spikes, noise and reflected ripple caused by inverter switching. This minimizes noise coupling to other loads fed by the same dc bus, the spokesman explained.

Regulation for the units is .02% for line and .05% for the load, the firm claimed. The peak excursion, in transient response time, is held to a few percent of output for most line/load step changes, and settling time is 50 microsec to within .05%, it added.

The units cost $59 each from Intronics, 57 Chapel St., Newton, Mass. 02158.

Plotter From HI Based on Micro

AUSTIN, Texas — An intelligent plotter that contains a built-in microprocessor for vector, character, arc, circle and symbol generation has been introduced by the Houston Instrument Co. (HI).

The DP-101 attaches to an RS-232C interface and features a 960-character data buffer, transmission rates of 110-, 300- and 1,200 bit/sec and a front-panel switch for manual pen positioning as well as a terminal switch for either mute or copy, a spokesman said.

Driven Off-Line

The plotter can be driven off-line via floppy disk or tape cassette in addition to its real-time applications, he noted.

Step size is .005 in./step at a speed of 400 step/sec. Transmission errors are automatically detected and corrected to prevent plot errors, the spokesman claimed.

Power requirements for the unit are 115- or 230 Vac at a maximum of 100 watts.

Price of the plotter is $3,495 from HI at One Houston Sq., Austin, Texas, 78753.

Sawyer UPS Requires Zero Transfer Time

ARCADIA, Calif. — Sawyer Industries, Inc. has introduced a line of uninterruptible power systems (UPS) that are directed toward applications requiring zero transfer time from line to standby.

The UPS 2000 series features outputs which range from 500- to 2,000 Va with a standby time of three to four hours at 75% load, a spokesman said. The 115V output is regulated to approximately 2% with a frequency stability of about 3% in the standby mode, he added.

Prices of the units range from $900 to $3,500 depending upon system configurations from Sawyer Industries, 5649 Peck Road, Arcadia, Calif. 91006.

The Versatile Generation.

Infoton's new generation of low price terminals does it all. The incredibly versatile 200 and 400 give you a choice of options unmatched in the industry.

Model 200 is a beautiful example. It is a Teletype compatible terminal with roll or page mode of operation. A detachable keyboard of solid state construction guarantees 100 million operations...ten times the performance of most mechanical keyboards. And the keyboard comes in five different configurations plus export versions to suit users' unique requirements. Other outstanding features include 9 x 9 dot matrix, addressable cursor, EIA and current loop interfaces and non-destructive forward and back spacing.

The 400 has everything the 200 has... and more. Built around the Z-80 microprocessor, it allows software designers to expand programs as needed without additional hardware. Capabilities include complete formating and editing with block mode transmission. Also character mode for normal log-in procedures or straight character operation.

Last but not least. Both the 200 and 400 have prices among the lowest in the industry. Only $795 and $1,095 respectively in quantities of 100. Write or call for full details.

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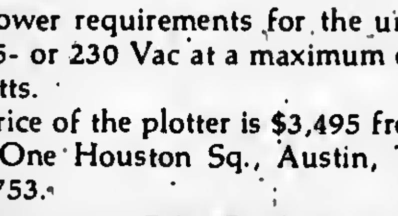

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Harris Adds Systems For Newspaper Layout

MELBOURNE, Fla. — The Harris Corp. has announced two additions to its 2200 series of video layout systems for newspapers that can each reportedly store up to 20,000 ads on-line.

Both systems feature such advantages as on-line storage of previously composed ads, on-line copy preparation and automatic storage and generation of boxes, rules and logotypes, the firm said.

The Model 2280A consists of a controller with 96,000 words of memory, the Harris HNS/2 and HDS software systems and a 66M-byte disk drive. I/O options include a Harris 1700 editing terminal, two 2200 display system interfaces and two optical character recognition (OCR) and typesetter interfaces.

The 2280B is a dual data base system with 132 million bytes of storage that is configured as a duplicate-recording system of 66 million words capacity. Every ad is stored separately on each of the drives for copy protection, a spokesman said. The system has 96K of CPU main memory, HNS/2 and HDS software systems and can accommodate up to four Model 1700 terminals, area composition controllers and photocomposition systems.

Prices for the 2280A and 2280B systems start at $125,000 and $160,000 respectively from the Harris Corp., 505 Rodes Blvd., Melbourne, Fla. 32935.

Tab Offers Two Models Of Imprinter/Merger

PALO ALTO, Calif. — Two models of an imprinter/merger that permit imprinting separately from bursting are being offered by the Tab Products Co.

The Model 2450, available as a free-standing or tandem unit, has a variable speed of from 0 to 350 ft/min with complete forms control, the firm claimed. The tandem model is designed as an add-on accessory to Tab's 2470 series bursters. It features a photoelectric light bar that controls AC power, allowing it to run synchronously with another machine, a spokesman said.

Imprinter Module

A feature of both models is an imprinter module that contains its own signature patch, print cylinder and ink-impregnated roll. Changing from one forms length to another is reportedly done by inserting the module that handles the forms length required.

The unit can also be equipped with marginal slitters for margin removal, center slitter for merging, a last-form stop switch and a key reset counter, Tab added.

Tab's free-standing or tandem imprinter/merger features a photoelectric light bar that controls power to the unit.

The 2450 stand-alone or tandem imprinter/merger is priced at $1,275 from Tab Products Co., 2690 Hanover St., Palo Alto, Calif. 94304.

Voice Input System Teletype-Compatible

DELRAN, N.J. — A voice data input system that can be used as a replacement for a video or teleprinter terminal with no modification of host computer software has been announced by Threshold Technology, Inc.

The Threshold 600 terminal is compatible with RS-232C, CCITT-V24 or 20mA current loop teleprinters. It features duplex communications via Ascii and is configured with a magnetic tape minicartridge storage device for handling output character strings, training prompts and speaker reference data, a spokesman said.

Standard Hardware

Standard hardware includes a speech recognition processor, a 16-char. alphanumeric display, two microphones, an operator console and a cartridge storage unit, the firm added.

Optional equipment is also available such as VHF radio input link for wireless communication, a multiple-line self-scan or CRT display and different communications protocols, Threshold said.

Price of the Threshold 600 is $13,500, the firm said from 1829 Underwood Blvd., Delran, N.J. 08075.

RJE goes local; effectiveness goes up.

Local Job Entry (LJE) is Braegen's inspired solution to the many drawbacks of conventional Remote Job Entry systems. LJE performs exactly like computer-room peripherals in conjunction with an IBM 360 or 370 System, but lets you locate your card readers and printers as far as a mile and a half away from your CPU.

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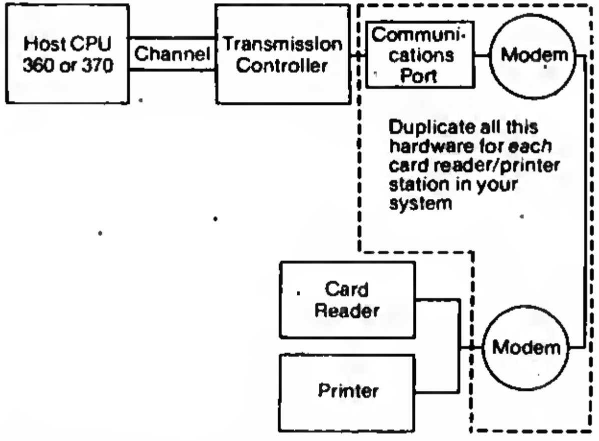
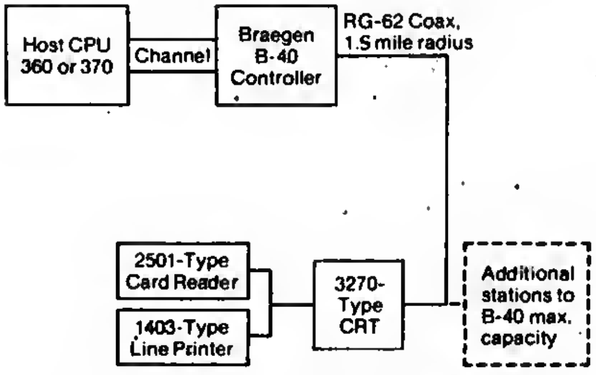


Between your remote station and your host computer, even in the same building, there's a transmission controller, a modem, telephone lines, and another modem. If the lines are good, and the modems are fast enough, it works just fine. It also costs a bundle.

The New LJE: Efficient and Economical



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Mini Bits

CA Cuts System Prices In Naked Mini 4 Family

IRVINE, Calif.— Computer Automation has reduced prices on several members of its Naked Mini 4 family. The reductions, said to be the result of "increased production efficiencies," average about $290 per system, a spokesman said.

For example, an LSI 4/30 with 16K words of random-access memory (RAM) now costs $2,195, 15% less than its former price of $2,590.

The LSI 4/10 processor with 8K words of RAM was reduced from $1,195 to $1,125, a 5% markdown.

Prices for the bottom-of-the-line LSI 4/10 with 4K RAM and all models of the LSI 4/90 did not change, the firm said.

Dual floppy disk subsystems that are used with the system were reduced in price 37%, the firm said, while single-drive models were dropped 31%. Software development systems with dual floppy disks were reduced in price by $1,000 and Pascal software was added to the system at no charge.

Cipher Adds Quiet Tape Drive

SAN DIEGO — A 125 in./sec vacuum tape drive aid that features quiet operation and low power consumption was introduced by Cipher Data Products.

Designed for use in small business systems located in work environments, the Whisper Drive includes self-test features with all operations under the control of a Z-80 microprocessor.

A low-speed blower system in the drive is credited with reducing the noise level associated with the system and reportedly allows users to operate the unit at either 50 or 60 Hz.

The Whisper Drive will be available in April for $6,650 from the firm at 5630 Kearny Mesa Road, San Diego, Calif. 92111.

Interdata Minis Get Option

AUSTIN, Texas — Houston Instrument has introduced an 016 option that simplifies interfacing its 8200 series printers to Interdata minicomputers, according to the firm.

The controller, a single circuit half-board, can be plugged into any Interdata 15-in. chassis, the firm said.

The 016 interface option costs $1,150. The 80-column 2,400 line/min Model 8210 printer costs $3,450 and the 132-column, 1,400 line/min Model 8230 costs $3,785 from the firm at One Houston Square, Austin, Texas 78753.

Planning Makes Installing Mini Less Traumatic: Haag

By Esther Surden
CW Staff

ANAHEIM, Calif. — Implementing a minicomputer system is not a trivial task and the more front-end planning given to the project the less traumatic and burdensome the implementation will be, according to Thomas Haag, president of Automated Business Concepts, Inc.

Haag told a session at the recent Mini/-Micro Computer Conference and Exposition here that stories of failures of minicomputer installations are almost always attributable to improper planning.

Proper preparation for a system should include evaluation of hardware environmental requirements, customized software requirements, how the data base is to be built, user and operator training, system maintenance and implementation scheduling, he said.

Although most minis require a minimum of special environmental considerations, the systems do need some. For example, the vendor should provide the user with a layout sheet showing the space requirements for the particular system.

Usually a 115-volt circuit can be used with minis but that circuit should be dedicated to the system and free of electrical surges, he said. If special wiring is needed, Haag added, it is the user's responsibility to get an electrician to do the work.

If the installed system needs cable to connect data input stations, the user is usually responsible for making sure the cable is run through the ceilings and walls.

Since minis often give off heat, a thermostat for cooling should be provided inside the room where the system will be located, he noted. Many vendors will provide a site inspection in advance of delivery to assure that the site is suitable for their equipment, Haag continued.

One of the main reasons a company buys a minicomputer is to get the controls provided by customized software, he asserted, and even when installations rely heavily on packages, "rarely is it the case that there is no requirement for customized software."

Often the user turns to an outside software vendor to help write the customized work. "You should require the software vendor to generate a detailed specification which you will approve" before programming begins, he told the group.

In addition, he advised users to make sure that the proper people within the company are available for consultation with the software analyst while he or she is designing the system.

Building Data Base

Another area that must be carefully planned to ensure a smooth installation is the building of the data base, Haag stressed.

If the data base is already on some type of storage device, the vendor should be able to convert the data base to his system at some cost to the user. But if the data base has to be built from scratch, the user must consider getting more people to do the work. Using current personnel may not work since they have their daily jobs to do. Services that do

(Continued on Page 42)

Basic/Four Unveils 200

SANTA ANA, Calif. — Basic/Four Corp. recently joined the ranks of small business system suppliers that offer users systems on which programs cannot be compiled.

The Basic/Four System 200 is a completely bundled system including a hard disk and modular program packages designed to fit the parameters of any given business.

A basic System 200 includes a CPU with 32K bytes of memory, 10M bytes of Winchester-type disk and a 120 char./sec bidirectional printer, a spokeswoman from the company said.

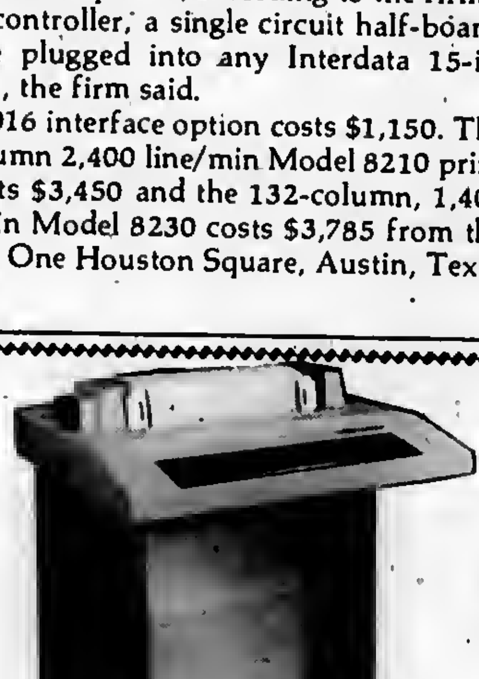
Accounting programs included in the price of the system are accounts receivable, accounts payable, general ledger, sales analysis, purchase order processing, order processing, fixed assets, inventory control and payroll, Basic/Four said.

Through a concept known as parameterization, the system can accommodate variations within industries, a spokesman said.

Applications software is also modular in nature or divided into components and tasks. For example, selecting the parameter to include a salesman's code in the order entry submodule would automatically link required information from order entry to commission accounting, sales analysis and general ledger, according to a spokesman.

Designed to be suitable for applications formerly performed by accounting machines, the system has a number of advantages over that equipment, the firm claimed. It offers random-access storage and interactive CRT capability unavailable on accounting systems, it stated.

The System 200 costs $29,000. Basic/Four can be reached through P.O. Box C-11921, Santa Ana, Calif. 92711.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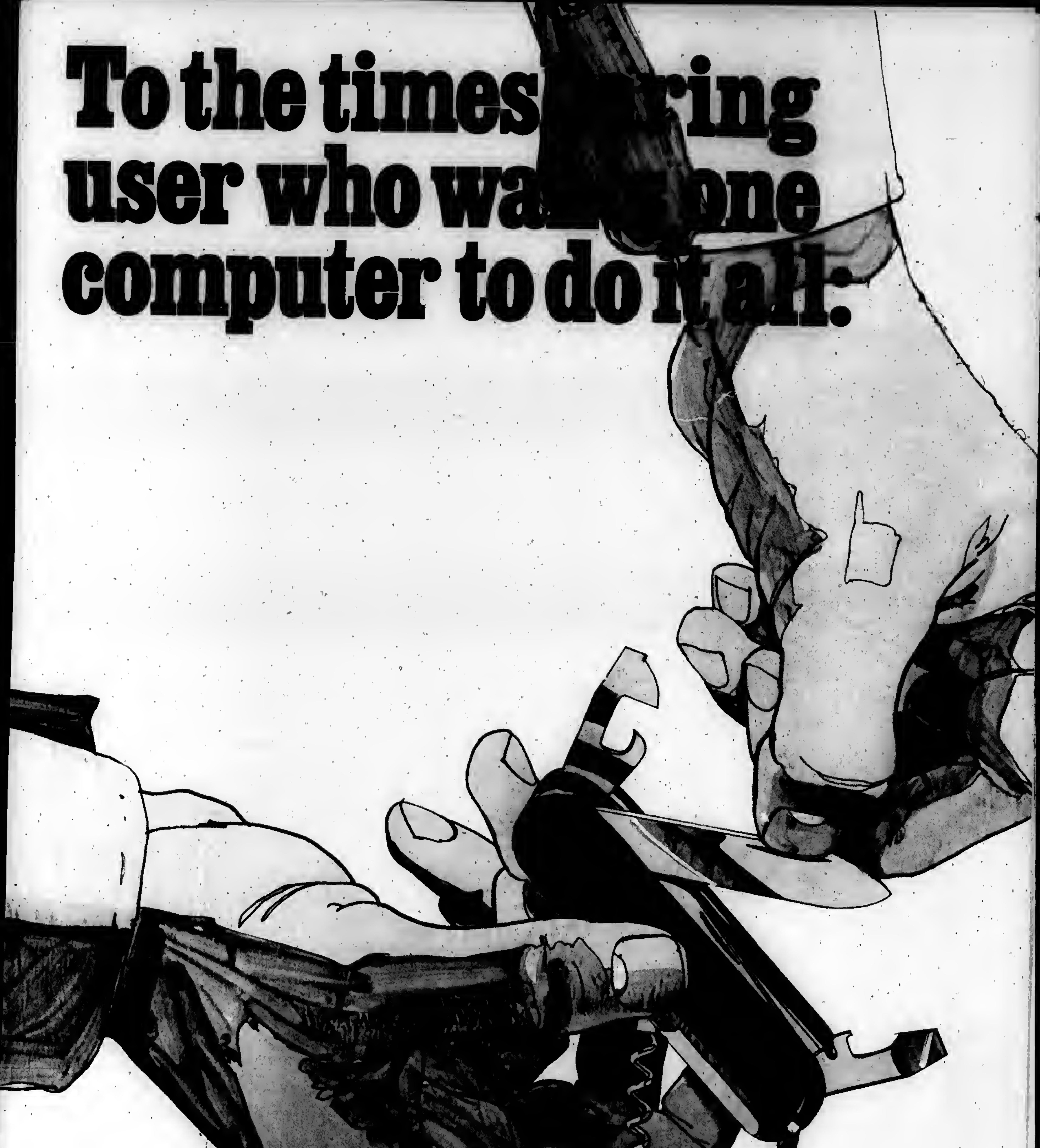

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One file structure is used by all Prime system software. Thus, all Prime data management resources are totally compatible. User files managed by MIDAS, Prime's Multiple Index Data Access System, are interchangeable with common data bases managed by DBMS, Prime's CODASYL-compliant database management system.

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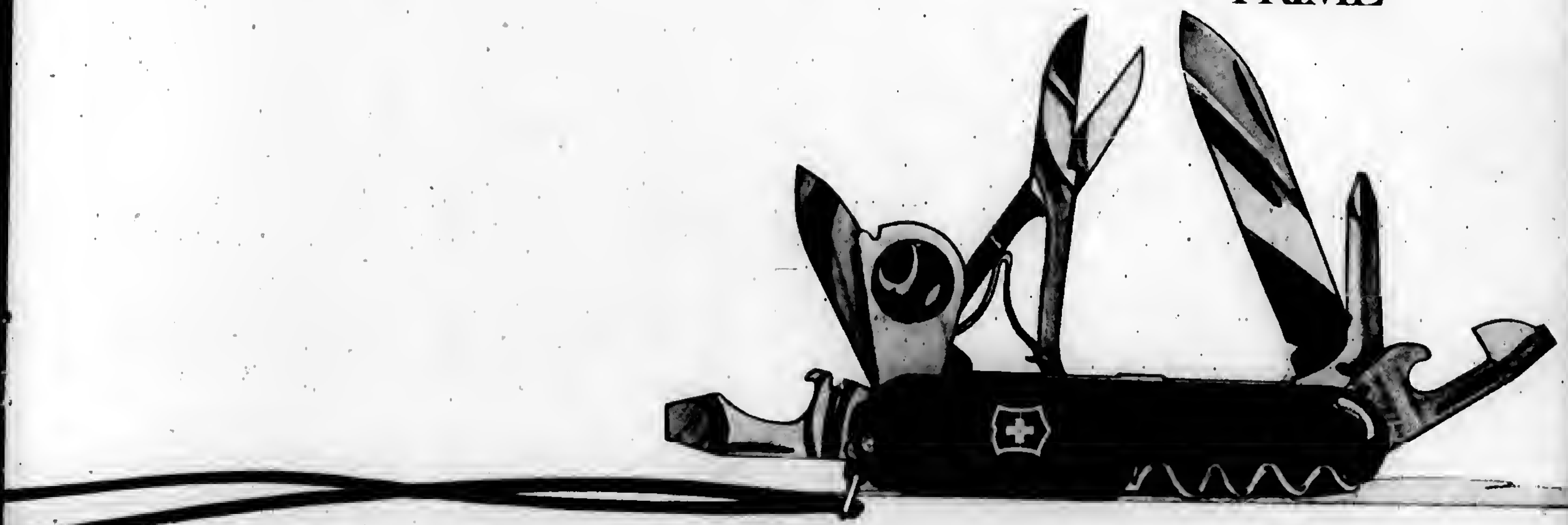

Prime can help

Small Systems Key to Future Data Uses: Poppa

HOLLYWOOD, Fla. — Business has entered a new age of information collection and use and the small, low-cost computer is going to play an enormous rôle as a tool for this age, according to Ryal R. Poppa, chairman, president and chief executive officer of Pertec Computer Corp.

"Internationally, there are more than 100,000 technical journals published each year. Just keeping track of that data is an enormous task. Man's body of knowledge doubles every five years. Transmitting and accessing such data is an awesome challenge," Poppa told attendees at a recent conference here.

To illustrate how a technology can be effective, Poppa noted that CBS News has developed an information retrieval system so it can easily access its 67 million feet of newsfilm, 16,000 hours of videotape, over 6,000 documentary programs and more than 35 years of newscast scripts.

"Many office environments already store data on comparable scales," Poppa noted. "Transmitting it and having subsets of that information in departments where it can be used is the immediate need," he said.

This telecommunications process can be likened to the role of R2D2 in the film "Star Wars," the Pertec executive explained. R2D2, a small, computerized robot was able to plug into a wall and access data from computer banks located throughout the film's moon-sized military satellite.

"It doesn't require much of a jump in technology to reach the point where data will flow from a storage typewriter's memory to a copying machine — or from one magnetic card typewriter to another that is thousands of miles away," he noted.

"We see the growth in this business largely with small companies — those who did not even consider a computer in the past. At the same time, there are more and more applications within departments and divisions of large companies.

"Frankly, we don't see the home arena becoming important until 1985, except for recordkeeping and electronic memorandum," he said.

"The big explosion is yet to come when instruments — like typewriters, copiers and facsimile transmitters — will actually be designed around a microcomputer or minicomputer network," he added.

Planning Cuts Trauma

(Continued from Page 39)

data entry work are available to help load the data base, he noted.

Since the data base is changeable, its completion should be timed to coincide with the installation of the system. Thus, once a particular data base has been loaded, the system should be able to maintain it.

Another potential source of problems that is often overlooked by users is training. Training should include general operation of the system as well as specific applications, and documentation should be available to assist the operator in its daily operation, he pointed out. One person should be given responsibility for daily scheduling of the system and that person should know all the applications run on the system, Haag stated.

File backup is another very important aspect of installation success, he continued.

"Most minicomputer systems use disks for on-line storage and backups are performed by copying information from one disk pack to another disk pack," he noted, adding that the packs should be stored in a fireproof safe.

Make or Break

The time it takes to perform the backup procedure can make or break an installation, he indicated. Backup procedures can take anywhere from 15 minutes to a few hours, and since it is an operation that should be performed once a day, the longer the procedure the less likely it is to be performed.

Getting good maintenance for a system is also essential for a successful implementation, he said.

"I recommend you try to find one source to maintain the whole system," Haag said.

In any case, several questions should be asked of the service organization, including the size of its spare parts inventory, its service hours, additional charges and "what happens if a system component must be removed for service."

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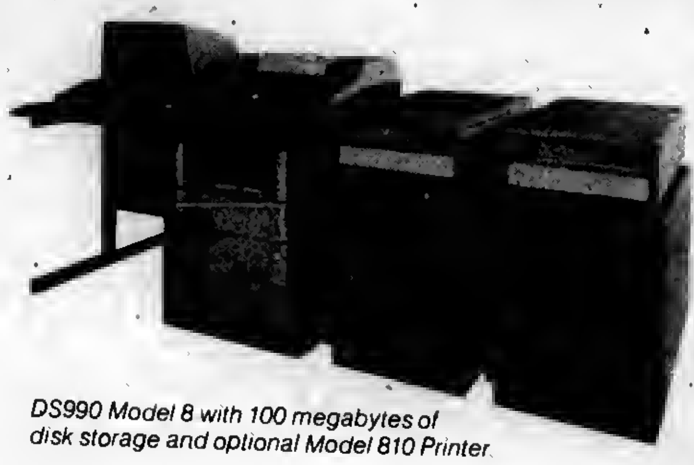

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Using 'Quasi' DBMS

Mini Helps Firm Handle Advertising Inquiries

Special to CW

N. HOLLYWOOD, Calif. — A minicomputer at Inquiry Handling Service, Inc. (IHS) here is helping this firm process, track and follow up on sales leads and inquiries generated by advertising, publicity releases, trade shows and direct mail.

The system handles the task using a quasi-data base management system, called "quasi" because although the record format of the inquiries is the same for all accounts, each report or special output requires a separate application program, according to Mike Simon, president of the firm.

The records include telephone number, name, title, company, address, city, state, Zip Code and coding information. The coding information refers to the source of the inquiry and when it was processed.

Because sales leads are perishable, the process is designed so that inquiries (names and addresses) entered on one day are answered the following day.

To facilitate the data base concept and allow updating of the records as inquirers respond, a copy of the address label (with a matchcode) is affixed to a business reply (or "bounce-back") card inserted into the response package.

A similar process is used with follow-up mailing to the inquirers and with the weekly sales lead reports generated by the system and sent to the field salesmen, Simon said.

Special reports produced on the mini are available to show cost-per-inquiry for each advertisement, number of leads sent to each sales territory, number of leads followed up and contacted by the salesmen, numbers and percentages of qualified inquirers from each ad, etc.

IHS started with a manual system, progressed to keypunches and sorters, and finally decided to process data through a time-sharing service.

"The major difficulty lay in finding a programmer/systems analyst who could work closely with us, understand what we needed, and who did not underestimate the effort in either time or money.

"We thought the job — creating application programs in Basic — would take six months; the programmer began work in July 1972, and he is still with us, revising, documenting, maintaining and creating programs. We'll never let him out of our sight," he added.

Eventually, as business increased, the service bureau costs increased and IHS chose to move to an in-house system. A number of manufacturers, including IBM, Interdata, Inc., Microdata Corp., Digital Equipment Corp. and Data General Corp. were considered. A priority was that the vendor selected be one that wanted single-installation business, Simon emphasized.

To rate the vendors, IHS devised a five-point scale. The points included the capabilities of Basic, the operating system, service and field maintenance, cost and the general attitude of the company as reflected by the salesman and his back-up people.

Some criteria carried more weight than others: the effectiveness of Basic (strong handling and file management) was most important because all the firm's existing programs were written in that language and although a conversion was necessary, the programmer was still most comfortable with Basic.

The price of the system was probably the least important (as long as it was in the ballpark — and just about all were) because an extra $5,000 to $10,000 over five years would not be prohibitive if it meant more efficiency and less downtime.

The choice was a DG Eclipse S/200 with 56K words of core memory, two 25M-byte removable pack disk drives, two tape drives, a 300 line/min printer and six CRTs.

DG's RDOS system was installed with Multiuser Basic, which came pretty close to what Inquiry Handling wanted. A few software changes were made by DG at a reasonable expense. These changes included eliminating the comma as a delimiter, overriding the automatic top-of-form on the printer (for printing labels) and adding two functions: SEQ, which returns the Ascii decimal value of character, and CHRS, which returns the Ascii equivalent of a value.

Based upon the volume of inquiries now being processed by the firm, Simon estimated he would have spent $8,000 to $9,000 per month using the service bureau. "We are now processing over 50,000 names per month," he said, "at a cost of about $6,000 for the computer phase of the business, including a full-time systems manager."

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'And I've Only Just Begun'

Hobbyist Reviews First-Year Experiences

By Thomas W. Murray Jr.
Special to CW

I would like to share my experiences in the construction and use of a hobby computer system. I believe I could write a fair-sized short story on my experiences in building a microcomputer system thus far, and I'm afraid I've only just begun.

When I returned to the U.S. in November 1976 after 2-1/2 years overseas, I found a hobby computer scene that was unfamiliar to me and larger than I had imagined. I have always wanted my own computer (I know few "computer jocks" that don't), so I set about to gather as much information as I could about the available systems, boards, microprocessor chips, etc. The deeper I dug, the more manufacturers, configurations and permutations I found. The volume of material available was mind-boggling, to say the least.

I spent several months gathering, analyzing and debating the options, and I talked to some people more familiar with hobby computers to gain some insight on other people's feedback and problems, etc. A technician at Personal Computing, a computer store in Frazer, Penn., helped me a great deal, especially with information on those manufacturers whose products seemed the best engineered.

The hardest problem of all, at least to me, was that each day something new, and possibly better, hit the market. I finally decided that although I might miss out on some fantastic new item, I would have to select what I wanted at that time so that I could get to work.

With this intent in mind, I laid out a system with what I knew was currently available that seemed to offer utility, expandability and reliability, yet be reasonably inexpensive. I decided on the S-100 bus, since most items available are compatible with it.

I also decided not to limit myself to any one manufacturer, but to get the best of each item I wanted, regardless of manufacturer, provided they were all compatible.

The system I laid out and ordered from the computer store mentioned above in April 1977 included the following:

- An Imsai Manufacturing Corp. 8080 less MPU board.
- A Z-80 MPU board by Technical Design Labs (TDL).
- A Z16K memory board by TDL.
- An Imsai MIO board (cassette, two parallel and 2 serial I/O ports).
- A Video terminal interface by Polymorphic Systems.
- An OP-80A paper tape reader by Oliver Audio Engineering.

I received most of these items in May 1977. I learned that delivery of the Z16K memory board could not be made until August, so I changed my order to get two Seals Electronics 8KSC-Z 8K memory boards, since there were no back orders on them. I ordered all my components in kit form.

In addition, I ordered a used CRT from the Computer Warehouse Store and a keyboard from James Electronics to which I added a keyboard encoder circuit of my own design.

The addition of a good portable cassette player (from General Electric Co.) for auxiliary storage completed the system. The total cost was approximately $2,300.

Kit Assembly

When I received the kits, I initially followed the sequence for assembly given in the Imsai 8080 system manual. The sequence described which boards and components of the system were to be assembled at which time. As I built the various boards, I found my background in designing PC boards and construction of other projects invaluable.

Most of the assembly manuals for the kits were good, with TDL and Polymorphic about the best overall and Imsai close behind. One Imsai section seemed out of date, however, with the part of the kit to which it referred.

In another case, the Imsai system assembly

(Continued on Page 47)

COMPANY	PRODUCTS PURCHASED	QUALITY	DOCUMENTATION	DELIVERY	PRICES
Imsai	8080 Less MPU and MIO	Good to Very Good	Fair to Very Good	*	Higher than Some
Technical Design Labs	Z-80 CPU Board	Very Good	Very Good	*	Good
Seals	8KSC-Z 8K Memory Boards (2)	Good	Good But Scant	*	Good
PolyMorphic Systems	Poly Video Interface	Good	Very Good	*	Higher Than Some
Oliver Audio Engineering	OP-80A Paper Tape Reader	Good	Good	*	Good
Cromemco	Bytesaver Computer Enterprises	Very Good	Good But Scant	—	Better Than Most
Computer Warehouse Store	Video Monitor	Fair	Poor	Very Good	Good
James Electronics	Keyboard and ICs	Good	—	Good to Very Good	Good
S.D. Sales	2708 Chips and Other Parts	Good	—	Very Good	Better Than Most
Radio Shack	Parts (especially ones needed in a hurry)	Good	—	Walk In and Walk Out	Higher Than Most
Advanced Microcomputer Products	Keyboard Encoder Chip	Good	—	Good	Good

*Shipped by computer store; delivery good.

Murray rates the vendors he has dealt with in the past year.

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CENTRAL PROCESSOR UNIT (CPU), MICROPROCESSOR — The central processor performs control, input-output, arithmetic and logical operations by executing instructions obtained from the memory sources. Most instructions use a 4-, 8-, 12-or 16-bit machine word. Depending on the number of separate memory accesses required, the processor may require one, two or three memory cycles to complete execution of an instruction. The typical processor includes a parallel arithmetic logic unit (ALU) that performs two's complement arithmetic operations and a parallel shifter unit (S) that performs logical and shift operations, etc.

CLOCK — 1. The most basic source of synchronizing signals in most electronic equpment, especially computers. 2. That specific device or unit designed to time events. 3. A data communications clock which controls the timing of bits sent in a data stream and controls the timing of the sampling of bits received in a data stream.

CMOS — Complementary metal oxide semiconductor (CMOS) technology uses both p- and n-channel devices on the same silicon substrate. Basic CMOS construction uses n- and p-channel devices connected in series. Only one device is turned on at one time, keeping power dissipation low. Switching of devices through the active region and charging and discharging the capacitance are main causes of dissipation.

COBOL — Common Business Oriented Language. 1. A data processing language that makes use of English language statements. 2. Pertaining to a computer program which translates a Cobol language program into a machine language program.

CODASYL — Conference On Data Systems Languages. The conference which developed Cobol.

COGO (COORDINATE GEOMETRY) — A language useful for solving coordinate geometry problems in civil engineering. Can be used as geometrically oriented urban data management systems.

COMMUNICATIONS LINK — 1. The means of connecting one location to another for the purpose of transmitting and receiving information. 2. A channel or circuit intended to connect other channels or circuits.

COMPILER — An automatic computer coding system which generates and assembles a program from instructions written by a programmer or prepared by equipment manufacturers or software companies.

CONTROL PROGRAM (MICROPROCESSOR) — A specific designed sequence of instructions that guides the CPU through the various operations otherwise programmed. Most often this program is permanently stored in read-only memory where it can be accessed but not erased by the CPU during operations.

From Microcomputer Dictionary & Guide by C. J. Sippl and
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Hobbyist Relives First Year of Building System

(Continued from Page 45)

guide was just plain screwed up, directing the user to install the fan before the power supply, part of which the fan covers very closely. The opposite order would be infinitely easier.

In the Polymorphic kit, the schematic supplied and the actual parts numbering silk-screened on the board and used in the assembly instructions did not match. The Seals memory boards came with a somewhat skimpy, though adequate, assembly manual. The CRT came with a couple of good schematics, but they were for a different make and were only close. The mechanical layouts provided were likewise for a different make, but they weren't even close.

Not Novice-Oriented

The one thing that was true of all the assembly manuals, with the possible exception of the Imsai manual, was that they were definitely not oriented toward the novice. Imsai had a large section devoted to general kit-building techniques, but even in its assembly guides, several sections had vague instructions which could have more than one interpretation.

Prospective hobbyists looking for Heathkit-type assembly manuals will be very disappointed. None of the kits I've seen have assembly manuals with Heath's type of no-fault assembly instructions.

In regard to user guides, those with the best assembly guides seemed to have the best user guides. In particular, the TDL and Polymorphic user guides were about the best. Imsai's user guides, usually with the assembly instructions for each part of the system, were generally good, except for the MIO user guide, which I had to read several times before I could figure out the configuration jumpers.

The Seals kit had no user guide. The monitor came with instructions for connection to a composite video signal and that was it. The OP-80A had a fair user's guide.

There was one bad part in the Polymorphic kit (a faulty IC), but since I had a replacement on hand in my parts bin, I never sent for one.

Having never had any problems I couldn't correct myself, I have never had to send any of my boards in for factory or other service. I am probably lucky in this regard, but because of this I have no idea how good any of the manufacturers are about servicing what they sell.

Despite the several small setbacks I had, my system was fully operational by August.

Latest Addition

My latest addition is a Cromemco Bytesaver erasable programmable read-only memory (Eprom) board ordered through Computer Enterprises. The assembly instructions were very brief, relying heavily on the silk-screened parts placement mask on the board itself. There were no pictures or placement guides in the assembly manual.

There was a program provided in the user's guide to allow writing (programming) of the Eprom's and transferring of Eprom data to random-access memory (RAM). The program and its use was well documented, but only allowed transfers in 1K blocks. The 2708 can be programmed in any size chunk, so I haven't been using the program.

The best reason for having the Bytesaver is that I no longer have to toggle in my bootstraps. It's a good thing, too, because my front panel switches are getting limp.

I am also constructing a software (I/O) control for the tape unit so that reads and writes will be software-controlled.

For future expansion, I am looking into getting a printer, but have yet to find exactly what I want at a price I can afford. It will most likely be a used line printer, however, since there seems to be a good many of those available in the used and surplus markets.

I had considered getting a printer capable of word-processing applications (upper and lower case), but these tend to be more expensive and/or slower and generally are electrostatic types. I would prefer an impact type so that standard DP-type functions can be handled (invoices, labels, etc.) where multiple copies may be needed.

Also under consideration is a floppy disk drive, but unless I stumble across some money I don't need very badly, I can't afford one yet. I am hoping that the cassette interface will be sufficient for most applications in which I will be involved.

The problem I am now facing is that all the software I can readily find is more or less totally teletypewriter (TTY) oriented. Some I've seen can be modified, and I have successfully modified the 1K monitor TDL supplied with its ZPU, but this seems like the hard way.

I can't imagine why any hobbyist would want an expensive, noisy, slow, greasy machine like a teletypewriter, costing almost $1,000, hooked up to his $2,000 (or less) system.

I can't possibly be the only one who feels this way, so it is hard to understand why all the software seems to be TTY-oriented. Possibly it's easier to write, and the manufacturers can afford a teletypewriter. It may also be a throw-back to the "old days" when minis in a minimal configuration all used TTYs for I/O.

I've sent inquiries concerning software to both TDL and Imsai but never received any reply from either. I am getting the distinct feeling that the extent of real support ends at the hardware level. However, with my B.S. in computer science from Penn State, I am confident that eventually I'll get it all together. It would be a lot easier, though, if I didn't have to develop most of my software from scratch.

I have learned a great deal through the construction, debugging and programming of my hobby system. A warning is in order for those who lack a technical background in hardware or software: Choose your system carefully, or you may end up in over your head. Those without any technical background should stick to a preassembled or Heathkit-type system or consider another hobby.

Murray is a hobbyist who lives in Athens, Ga.

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The schedule for the current Series ending in April is:
January 19, 1978, Orange County, CA
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April 4, 1978, Hasbrouck Heights, N.J.
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Sponsors Set Up '78 Shows

The 1977 microcomputing show season has ended, and the show sponsors are beginning to line up the exhibits and show dates for 1978.

Following is a list of hobby shows for 1978. Schedules are subject to change, and hobbyists are urged to confirm any show dates before making firm plans.

Jan. 13-15, Washington, D.C. — **Personal Small Business Computer Expo.** Contact: Felsburg Associates, Inc., P.O. Box 624, Seabrook, Md. 20801.

Feb. 27-March 1, Philadelphia — **1978 Business and Personal Computing Sale and Exposition.** Contact: Produx 2000, Inc., Convention Services Department, Roosevelt Blvd. & Mascher St., Philadelphia, Penn. 19120/

March 3-5, San Jose, Calif. — **Second West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.

March 17-19, Pasadena, Calif. — **Micro-Business '78.** Contact: The Show Co. International, 8687 Melrose Ave., Los Angeles, Calif. 90069.

April 28-30, Long Beach, Calif. — **Percomp '78** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif. — **National Computer Conference & Computer Festival.** Contact: Steve Miller Stanford Research Institute, 333 Ravenswood, Menlo Park, Calif. 94025.

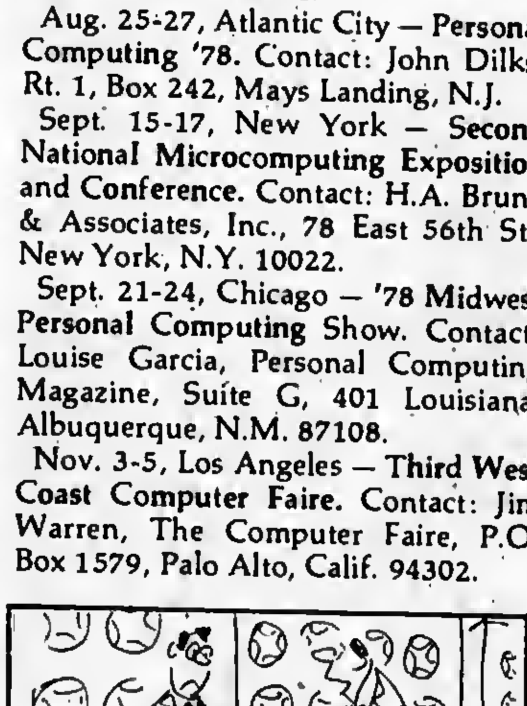
June 23-25, Detroit — **Macc Computerfest '78.** Contact: Jim Rarus, Semco, Box 9578 North End Station, Detroit, Mich. 48201.

Aug. 25-27, Atlantic City — **Personal Computing '78.** Contact: John Dilks, Rt. 1, Box 242, Mays Landing, N.J.

Sept. 15-17, New York — **Second National Microcomputing Exposition and Conference.** Contact: H.A. Bruno & Associates, Inc., 78 East 56th St., New York, N.Y. 10022.

Sept. 21-24, Chicago — **'78 Midwest Personal Computing Show.** Contact: Louise Garcia, Personal Computing Magazine, Suite G, 401 Louisiana, Albuquerque, N.M. 87108.

Nov. 3-5, Los Angeles — **Third West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.



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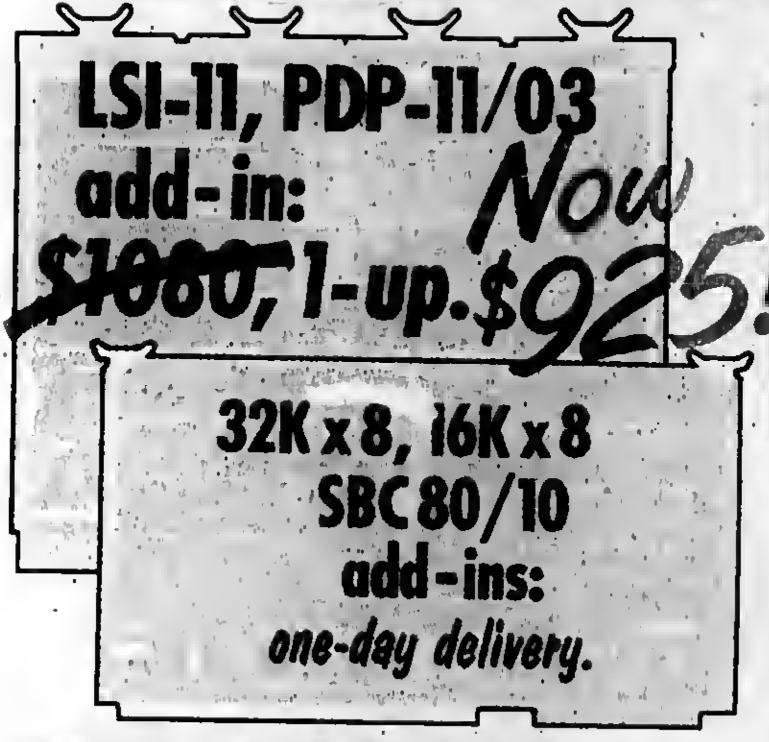

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MMS1118 MMS1118-1 MMS1118-2	16K x 18 12K x 18 8K x 18	Add-in for PDP-11/04, 11/34 systems
MMS3400	32K x 18 or 64K x 9	For 3400N systems
MMS68102 MMS68102-1 MMS68102A MMS68102A-1	16K x 8 8K x 8 16K x 9 8K x 9	Battery backup for M6800 and other synchronous systems; pin compatible with EXORciser* micromodule
MMS68103 MMS68103-1 MMS68103A MMS68103A-1	16K x 8 8K x 8 16K x 9 8K x 9	Hidden refresh for M6800-based systems.
MMS68104	16K x 8	For MEK6800D2 Kit
MMS80810 MMS80810-1	32K x 8 16K x 8	For 8080A-based systems; pin-compatible with SBC 80/10

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Bell Task Force Proposal Draws Fire

BY Molly Upton
CW Staff

The telephone industry task force's proposal to Congress which would restructure telecommunications services [CW, Dec. 12] has drawn quick opposition from a number of communications firms and organizations.

Two specialized carriers plainly stated that the proposal, if put into effect, would put their firms and probably the other specialized carriers out of business. A major thrust of the proposal is to limit interconnection with the telephone company network.

Other carriers, such as the value-added firms, have received assurances that the proposal is not intended to limit their access to the Bell network, so they therefore have somewhat less reason to oppose the proposal.

But Telenet, a value-added packet-switching carrier, dislikes the proposal because it favors a competitive industry, which the proposal is designed to eliminate.

Furthermore, Telenet and associations such as the Computer & Communications Industry Association (CCIA) and the Ad Hoc Committee for Competitive Telecommunications (ACCT) decried the pricing strategy embodied in the proposal.

They claim the proposal would facilitate incremental costing, a move in direct opposition to the Federal Communications Commission (FCC) endorsement of fully allocated costing.

Nearly all disavow the term "compromise" used by the task force in presenting the proposal. In reality, the proposal is intended as a replacement for the Consumer Communications Reform Act, also known as the Bell Bill, which has been making little headway in Congress, they said.

'Massive Upheaval'

The proposal represents a "massive upheaval of the telephone system" and is "ludicrous," according to Rex Hollis, vice-president of marketing sales for Southern Pacific Communications. Specialized common carriers would be dead just as effectively under the task force's plan as under the Bell Bill, he contended.

"There's absolutely no way specialized common carriers such as ourselves could survive under the restrictions placed on them by the new proposal. The instructions would effectively eliminate many of the services that Bell itself decided were necessary back in the precompetitive days," such as foreign exchange and the Common Control Switching Arrangement (CCSA), he said.

These are areas where specialized common carriers have a very large percentage of their business, he continued.

The proposal is more insidious than the Bell Bill, he said, which at least openly opposes competition. While the task force proposal appears to represent a turnaround and to be endorsing competition, "if you scrape off the veneer you find they really aren't giving people a choice because anything that is connected to the national public switched network is going to be through one of the telephone companies and the specialized common carriers would be dead."

"The portion that would preclude us from connecting service into the public switched network basically the whole thrust of the proposal — would hurt us most," he said.

'Business Gone'

The proposal mentions briefly that foreign exchanges would be eliminated. But foreign exchanges represent a large portion of Southern Pacific's installed base, Hollis said.

Foreign exchange enables a reservations

(Continued on Page 50)

ADL Sees DP Market Growth Winding Down to Under 10%

CAMBRIDGE, Mass. — The U.S. market for computer equipment will slow to an annual growth rate of less than 10% while overseas markets continue to expand at an 11% to 13% rate over the next five years, according to Arthur D. Little, Inc. (ADL), a market research firm here.

At the same time, the ADL report said the IBM 30 series of computers will be a "powerful competitive tool" for the firm and said the systems have strengthened the firm's position in relation to other U.S. mainframers, particularly those in the plug-compatible CPU market.

ADL's annual five-year forecast of the general-purpose computer industry predicted a U.S. installed base (cumulative shipments minus returns) of $76 to $80 billion (constant 1977 dollars) by the end of 1982. The 1977 year-end value was estimated at $52.2 billion.

The installed base in the rest of the world at the end of 1982 will be $79 to $85 billion, the firm added. The estimate for the end of 1977 was $47.4 billion.

U.S. manufacturers will have an overseas installed base of $52 to $58 billion by the end of 1982, the firm said, constituting an annual increase of 8% to 11% from $34.3 billion estimated for the end of 1977. The U.S. share of the market will drop from 72% in 1977 to 68% in 1982, primarily because of marketing of plug-compatible CPUs by the Japanese, ADL forecast.

The growth of the worldwide installed base during the next five years will reflect a continuation and acceleration of 1977's higher gross shipment and return values because this is typical in a period of new product introductions, ADL said.

Record-breaking gross shipments of improved products will be accompanied by a wave of returns of existing rentals and retirement of purchased machines, the firm said, but returns will not offset shipments to the same degree as in 1971-1973 because a much smaller part of today's installed base is rented.

New Marketing Era

"As the industry's new bellwether, the IBM 303X family casts a shadow over everything," according to ADL's Frederic G. Withington. New software products are now as important as new hardware in causing computer capabilities to improve and thus will become a major source of revenue, he added.

Furthermore, IBM's increased reliance on microcode to determine system functions also underlies a new competitive situation.

"The pace of IBM's new product introductions has sharply accelerated. The existing 303Xs will probably be followed by many more evolutionary announcements. The result will be increased pressure on IBM's competitors to keep up with IBM and at the same time maintain profitability," he predicted.

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Bell Task Force Proposal Gets Fast Opposition

(Continued from Page 49)

system to offer local numbers to prospective passengers when in reallty the reservations center is located elsewhere.

The CCSA — a large private switching system for private or government users — would be prohibited from calling into the telephone company network under the proposal. Southern Pacific's Sprint network, which is a switched private network for smaller customers, would be killed, Hollis stated.

"The majority of our business would be gone. We could not exist under those conditions."

MCI Communications Corp.'s vice-president and general counsel, John Worthington, called the proposal "an outrage."

"I would be knocked off my chair if anybody over at the FCC were to consider it a serious proposal," he said.

The proposal leaves MCI with point-to-point microwave communications. Worthington said he would be surprised if that market was $10 million, whereas MCI is annually grossing $80 million and is just "barely above water."

Hollis sees an easier fight than with the Bell Bill because the proposal will affect the consumer to a great degree. "The proposal is changing around the consumer's whole method of operations, so I feel we will have many more allies. We're going to be very vocal about it and try to educate people on what a disaster this would be.

"I feel confident this will not be a major fight because the proposal is so far reaching and ridiculous, the fight should be far easier" than against the Bell Bill, he stated.

"As soon as the public sees what the proposal is doing, I feel there will be a massive opposition to it," he added.

Telenet Opposed

Although Telenet does not see itself being as adversely affected by the task force plan as the specialized common carriers, it does vigorously oppose the proposal.

Phil Walker, vice-president and general counsel, indicated the task group which created the proposal has advised Telenet the proposal is not intended to preclude value-added carriers from connecting to the switched network.

Telenet opposes the proposal because the firm favors a competitive industry, including specialized common carriers, he said. The proposal is designed to kill the specialized common carriers and would create a very hostile climate, he added.

The proposal is a "very transparent end run at establishing incremental costing whereas the FCC just completed eight years of rate studies concluding there should be fully allocated costing," he said.

The telephone exchange "is a national resource and it's preposterous to say that carriers cannot access it," Walker stated.

The issue where compromise is needed, and which is not addressed in this proposal, is the procedure by which local service is subsidized by long distance service, he said.

Herb Jasper, executive vice-president of ACCT, indicated the proposal represents the first time Bell has admitted that it seeks to turn back the clock.

Bell had denied the Bell Bill would halt independents' interconnection with the switched network, he said, but the current proposal admits this fact.

In a letter to Congress, ACCT charged the task force proposal has the same objectives as the Bell Bill.

The proposal, which purports to be a compromise, "contains virtually no recogntiion of the serious problems which exist in a monopoly-controlled industry; it would drastically curtail the existing competition which the FCC and the courts have repeatedly found to be in the public interest," ACCT stated.

"Just as surely as the Bell Bill, it would put our companies out of business," ACCT said.

Whereas the Bell Bill "would have eliminated competition by a single stroke, the new proposal would starve us out of existence," ACCT continued.

"Under the narrowest interpretation of FCC decisions, we have been competing with AT&T's Long Lines Department to earn our tiny share of the $1 billion specialized interstate transmission services (or 'private line') sector.

"The new proposal would turn back the clock and restrict us to competing for just a small fraction of that sector; indeed, it would require that we cease providing a wide variety of services to our existing customers," ACCT stated.

CCIA: 'No Compromise'

The CCIA also called the "compromise" proposal "no compromise."

"It is a special interest plea to disregard almost 20 years of the expert agency's deliberations and appeals courts' decisions," according to A.G.W. (Jack) Biddle, CCIA president.

The industry is "counting on its political clout to achieve what it has failed to achieve through established regulatory and judicial channels," he said.

Under the proposal, "the service suppliers who desire to lease carrier facilities will have to pay their full cost even though the underlying carrier will be permitted to price a competing service over the same facility at its incremental cost," Biddle stated.

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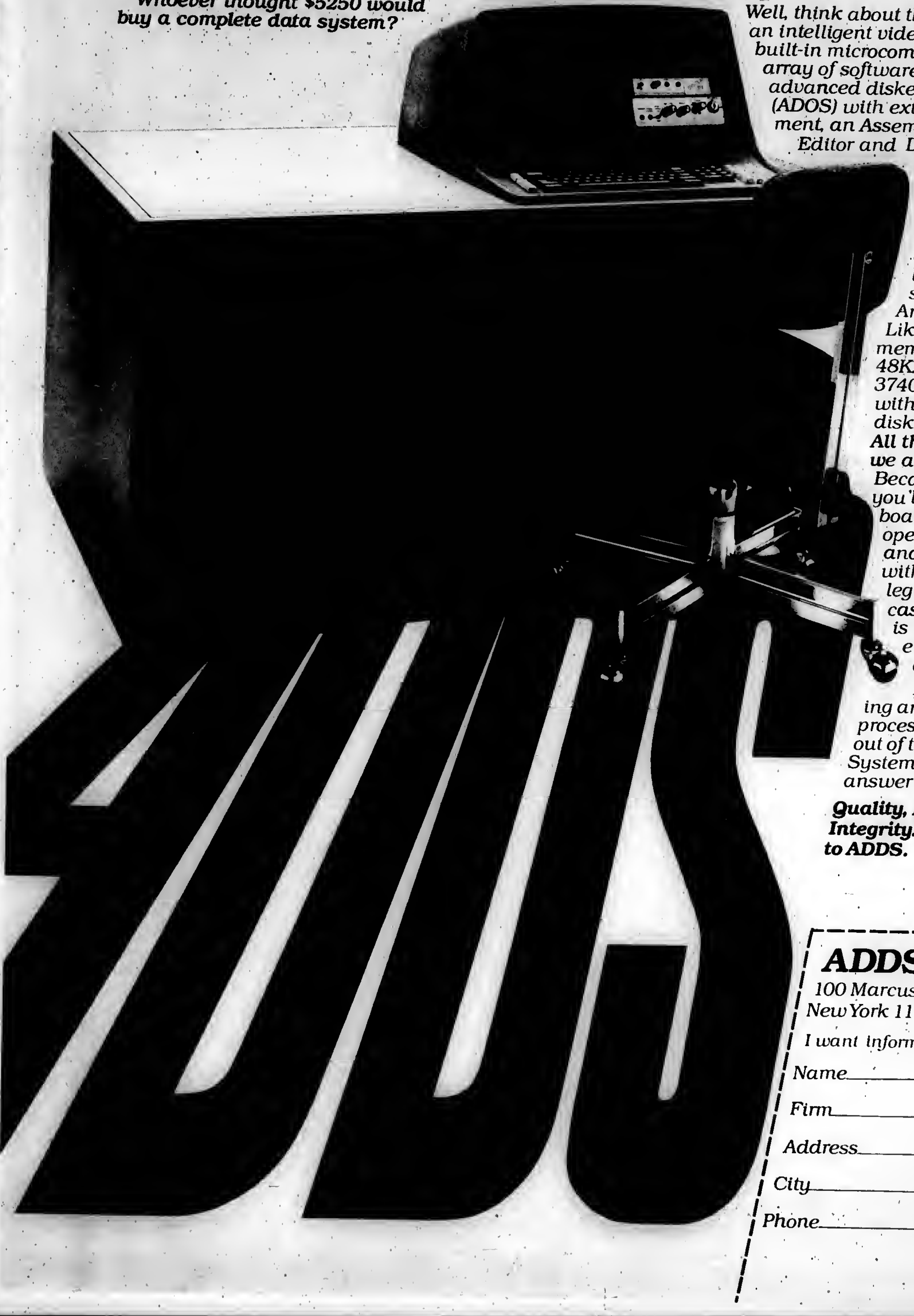

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Documation Pleased With Its Decision to Supply

By Molly Upton
CW Staff

MELBOURNE, Fla. — Although the front-end expenses of entering the end-user market are "mind boggling," 15 months after making the plunge, Documation, Inc. is receiving about half its revenues from end-user business, according to President S. Ray Halbert.

Eventually, Halbert said, the firm will probably be totally an end-user supplier.

Revenues for the year ending Jan. 31 will be more than $30 million, almost double last year's $18 million, and the end-user business is contributing to the firm's continued profitability, he said.

When Documation, which until recently was exclusively an OEM supplier of card equipment, announced its intention to enter the end-user market, industry sources were skeptical.

But Halbert had done his homework, gone public to garner the needed capital, and started making and marketing a high ticket item for the end-user market — line printers.

Entering that market was necessary for the firm's continued survival and growth, he said.

In 10 Years?

"What's out there in 10 years for us?" he asked. Most companies elect to vertically integrate products when the demand becomes great enough. "There's a permanent lid on our head" in the OEM business, he continued.

Documation's IBM-compatible 6501 card reader read crumpled and torn cards inserted by Jim Sunderland.

CW Photos by M. Upton

Gary Fisher, Documation vice-president, looks at DOC 2250's microprocessor-based controller and diagnostics unit.

No company has reached the $500 million mark in wholesale, he said.

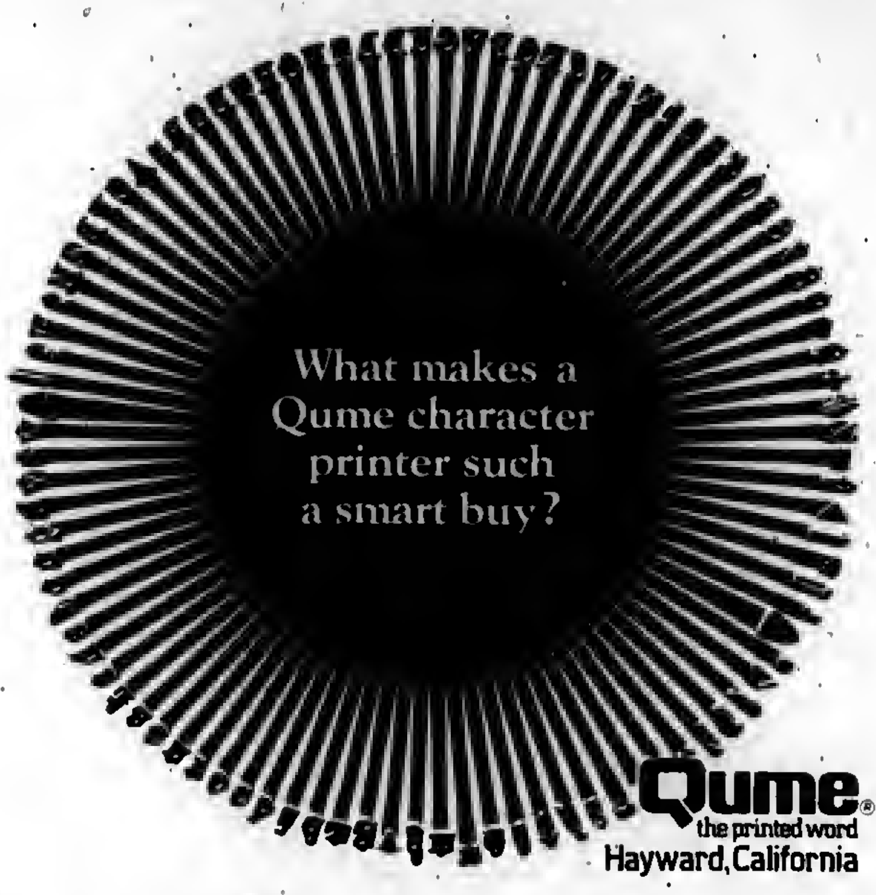
The end-user business is quite different in many respects from the OEM arena, and Halbert likes the feedback from clients.

"I really enjoy the end user. We make him happy. We'll take back a box" if he's not pleased and charge for it as if it were rented, he stated.

In the end-user business, Documa-

(Continued on Page 53)

DOC 2250 printers are tested using an IBM 360/30.



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Orders & Installations

Avco Computer Services has installed its second IBM 370/158 at its Wilmington, Mass., facility. The company has ordered an IBM 3052 attached processor and an IBM 3033.

Lotspeich Co. of Miami, Fla. has installed a Geigel & Williams turnkey system valued at approximately $40,000.

Datamation Associates has purchased 50 Sycor 350 intelligent terminals valued at more than $800,000 for use is custom service operations.

Coastal Plains, Inc. has installed a Honeywell Information Systems Level 66 computer system at its Dallas headquarters. The total system with terminals is valued at nearly $1.2 million.

Armorlite, Inc., manufacturer of hard resin contact lenses, has ordered a Univac 1100/11 valued at approximately $1 million to improve order entry and shipping efficiencies.

The Register Publishing Co., Inc. of New Haven, Conn., has ordered a $1.5 million integrated system from Tal-Star Computer Systems.

Citibank (New York State) NA has installed twin NCR Criterion 8550 systems, 17 NCR 7750 distributive document processing systems and visual display units valued at $2 million.

The County of Dallas has installed its first Memorex 3650 production unit. It has a total of 36 Memorex 3650 disk drive spindles on order, with six of the spindles up and running.

Mattingly Stores, Inc. is being furnished with the Deposit Reporting System by National Data Corp.

Barron Industries, Inc., manufacturer of pollution control systems, has ordered a Honeywell Information Systems Level 62 system valued at $130,000 to be used for engineering and design application.

The Michigan State Police will upgrade its Law Enforcement Information Network (LEIN) with ICC Model 40+ data display terminals for users of the Michigan State Police Criminal Justice Data Center.

Printers to End Users

(Continued from Page 52)

tion gets "glory for having done a good job of designing and machining the equipment" whereas the OEM is always "beating on its supplier to make the product cheaper," according to Halbert.

Referring to the front-end costs of establishing marketing and other support for an end-user base, Halbert said the firm "has paid the price" and has over 100 people devoted to this area.

S. Ray Halbert

Documation has established over 16 offices, in the U.S. and five in Canada and abroad within the last 15 months.

"A lot of people said I was crazy. It took a lot of courage, and we did it from a very small OEM base," he said.

Documation started with card units, and Halbert insisted cards are not dead. "Every computer room wants some cards for programmers, and we happen to have a low-volume reader and punch that fits the bill," he said.

"I see cards lasting for a long time. The volume is still going up. It's a good bread-and-butter line," he said, noting that the firm's LC50 card unit would fit well with small business machines.

Currently, Documation's business is split about 50-50 between cards and printers.

The correlation in percentages of OEM vs. end-user business is no accident—because Documation's printer business is almost exclusively end-user and card units are OEM. The firm does not sell card units to end users except as an adjunct to a line printer.

Currently, the Documation line printers, which were designed from the ground up to be IBM-compatible, range in speed from 1,250- to 1,500- to 1,800 and 2,250 line/min.

The DOC 2250 printer features a microprocessor-based self-diagnostic unit that will print out the character images the CPU is sending. This feature is designed to avoid protracted finger-pointing episodes by IBM, Halbert observed.

Documation has only one OEM contract, for printers but Halbert said he expects more OEM business when the firm comes out with a lower speed unit. The biggest volume of demand for printers is in the 600- to 1,200 line/min area, he said.

Documation intends to broaden its printer line in both directions, he stated.

Bursting at Seams

The firm is currently bursting at the seams while awaiting completion of a 40,000 sq-ft office building. There are 11 trailers of various sizes, providing temporary space for some of the 1,000 employees. A year ago, the firm had 500 employees.

Next year, Halbert said he will be happy with a 50% growth rate because it is difficult to get the necessary capital and the firm may have to rely on retained earnings to fuel its growth. "The product line has the capability to double, but we don't have the capital," he said.

In addition to its plant here, the firm has a 56,000 sq-ft card reader subassembly facility in Puerto Rico.

A subsidiary, Advanced Board Circuitries, Inc., occupies 22,000 sq-ft and produces PC boards for Documation as well as other firms.

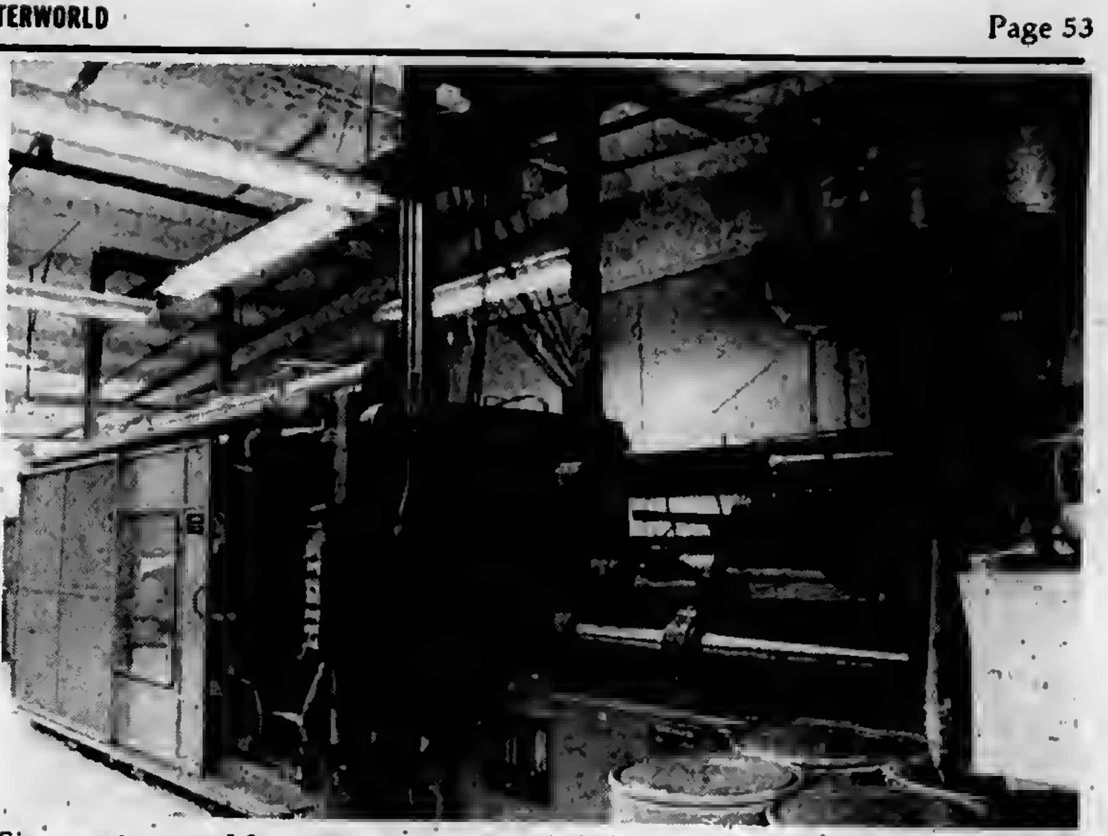
Halbert's background is in mechanical engineering, as might be guessed from a look at the plant. The firm takes vertical integration seriously and designs and manufactures 95% of the precision mechanical components used in its products.

Plant's Machinery

It owns several immense computer-controlled machines that precision-drill parts. The firm also has a structural foam injection molding machine that turns out covers for Documation as well as for some other firms.

In addition, a plastics room molds several parts.

Halbert started the company in 1970 with a patented technique incorporating a vacuum pick and air riffle to move cards through the reader. A demonstration in the plant showed the 6501 could calmly process a very crumpled up card as well as one torn in half.


Siemag structural foam injection molding machine enables Documation to make covers and other machine parts.

Not a trailer lot but the overflow from the current Documation offices.

Acquisitions

Data Access Systems, Inc. has acquired **International Computer Equipment, Inc. (ICE)**, a supplier of terminals.

Micon Industries has acquired **Advance Quality Wire Wrapping Services** of San Jose, Calif.

Perkin-Elmer Corp. has acquired the business and assets of **Precision Micro Design, Inc.**, designers of customer LSI devices.

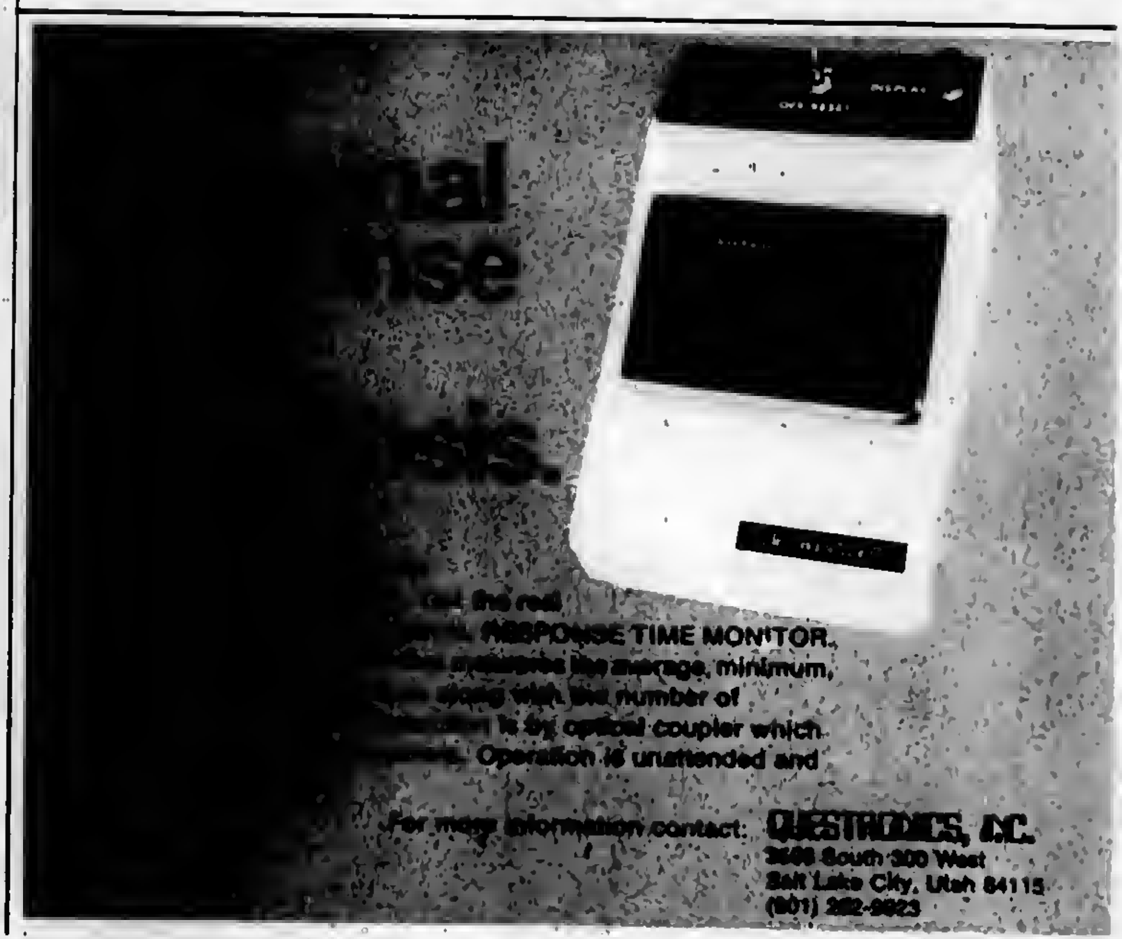
Alanthus Corp. has acquired **MI² Corp.** of Columbus, Ohio, a maker of modems, acoustic couplers, terminals and printers.

New Registrations

ON-LINE SYSTEMS, INC., 115 Evergreen Heights Dr., Pittsburgh, Pa. 15229 filed to register 10,000 shares of common stock. No underwriter is involved.

SYSTEMS ENGINEERING LABORATORIES, INC., 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33313 filed to register 150,000 shares of common stock. No underwriter is involved.

ROLM CORP., 4900 Old Ironsides Dr., Santa Clara, Calif. 95050 has filed to register 100,000 shares of common stock. No underwriter is involved.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In Computer Systems Division

Off-Loading Mainframes Seen Boon for Harris

By Molly Upton
CW Staff

FORT LAUDERDALE, Fla. — Although the primary use of its 24-bit systems is in the scientific arena, Harris Corp.'s Computer Systems Division is finding off-loading mainframes one of its fastest growing areas, according to Harold N. Morris, corporate vice-president and general manager of the division.

An increasing number of businesses need multiuse capabilities like those offered by Harris equipment, Morris said. He defined "multiuse" as the capability to simultaneously run more than one language while also probably continuing to perform number crunching.

Currently Harris bundles its software, except for Cincom Systems, Inc.'s Total data base management system and Harris' remote job entry capability.

"The option to unbundle is open to us down the road, but right now we feel we can serve our market better by bundling," Morris said. Users can obtain free updates of operating systems, he pointed out.

Harris is not in the iron only business; the average system price is well over $200,000, he said. When shipped, a Harris system consists of a CPU, controllers, operating software, memory and peripherals.

The firm spends 10% to 11% of revenues in development, Morris said, and software includes a range of operating systems, languages, utilities and remote job entry packages.

The Vulcan operating system provides virtual memory capabilities. Languages include Fortran IV, Basic, RPG-II and Snobol 4 as well as a macro assembler and a diagnostic Fortran compiler.

Although the firm does not provide applications software, the year-old users association permits the exchange of routines, he added.

Contrary to other firms that are racing toward vertical integration, Morris feels it is more prudent to buy peripherals. By purchasing peripherals, Harris can switch to improved products and avoid carrying R&D costs in these areas, he said.

The firm sees as competitors Digital Equipment Corp. with its Decsystem-10 and PDP-11 series, Hewlett-Packard Co. with its 3000-II and occasionally Prime Computer, he said.

As an indication of the firm's foothold in the mainframe off-load arena, Morris said Harris sees mainframers in 10% of the bidding situations.

Being a minicomputer firm is not an obstacle in the mainframe off-load arena, he said, because customers are showing a growing awareness of the capabilities of minis.

Eyes Niche

Morris sees a niche between IBM's General Systems Division and the Data Processing Division that gives independents an opportunity to compete.

Seventy-five percent of Harris' shipments are directly to end users, he observed, which places the firm almost nine months ahead of where he predicted the firm would be four years ago.

The firm sells to systems houses as well as to other Harris divisions such as the Commercial Satellite and Controls System operations. The Composition unit uses DEC equipment, reflecting an arrangement in existence prior to Harris' acquisition of Datacraft, which became Harris Computer Systems.

Harris is controlling its growth of field engineers, analysts and salesmen to about 15% a quarter, he observed."It's a seller's market for a good salesman," he commented.

Why 24 Bits?

Why a 24-bit word? Morris admitted that if he were to start from scratch, he would not pick the 24-bit word length. Probably his choice would be 36 bits which IBM uses in some systems, he indicated.

But Datacraft picked 24 bits rather than 32 because 24 gave it sufficient capabilities for its scientific market, he said. By doubling to 48, the firm covers scientific needs quite well, he said.

Other firms chose 32 bits because it enabled them to keep their 16-bit software, he noted.

In the future, word length restrictions will diminish both through hardware and software changes, he predicted.

Looking at new technology, Morris said he expects continued semiconductor advances to aid the firm. Harris now incorporates the 4-bit bipolar American Micro Devices 2901 in its systems.

However, it continues to use 4K memory chips and is holding back from committing to 16K until their availability, reliability and cost make sense, he said.

One product area offering immense opportunity is a high-speed device in the range between main memory and disk, he observed.

Harris is looking at charge-coupled devices and bubbles for this purpose. Whoever comes up with a suitable product could make a fortune, he said.

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1976 DP expenditures: *$3.9 billion*
1976 imports from U.S.: *$305 million*
Rank as importer from U.S.: *Second*

Computer Management is a monthly magazine owned by *Computerworld*. Circulation is 21,050.

COMPUTERWOCHE

GERMANY

World rank as DP market: *Third*
1976 DP expenditures: *$5.4 billion*
1976 imports from U.S.: *$292 million*
Rank as importer from U.S.: *Third*

Computerwoche is a weekly tabloid newspaper owned by *Computerworld*. It has a circulation of 21,500 to the West German computer community.

SHUKAN COMPUTER

JAPAN

World rank as DP market: *Second*
1976 DP expenditures: *$6.9 billion*
1976 imports from U.S.: *$240 million*
Rank as importer from U.S.: *Fifth*

Shukan Computer is a weekly tabloid newspaper, jointly owned by *Computerworld* and *Dempa* publications. Circulation is 35,000.

ZERO-UN INFORMATIQUE

FRANCE

World rank as DP market: *Fifth*
1976 DP expenditures: *$3.9 billion*
1976 imports from U.S.: *$273 million*
Rank as importer from U.S.: *Fourth*

Computerworld represents Zero-Un Informatique in the U.S. Zero-Un has three publications, one a weekly tabloid newspaper with a circulation of 22,000; the second a monthly magazine, circulation 13,000 copies; and a bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS

BRAZIL

World rank as DP market: *Fourteenth*
1976 DP expenditures: *$440 million*
1976 imports from U.S.: *$29.3 million*
Rank as importer from U.S.: *Fifteenth [est]*

DataNews is a bi-weekly tabloid newspaper owned by *Computerworld*. It has a circulation of 7,000.

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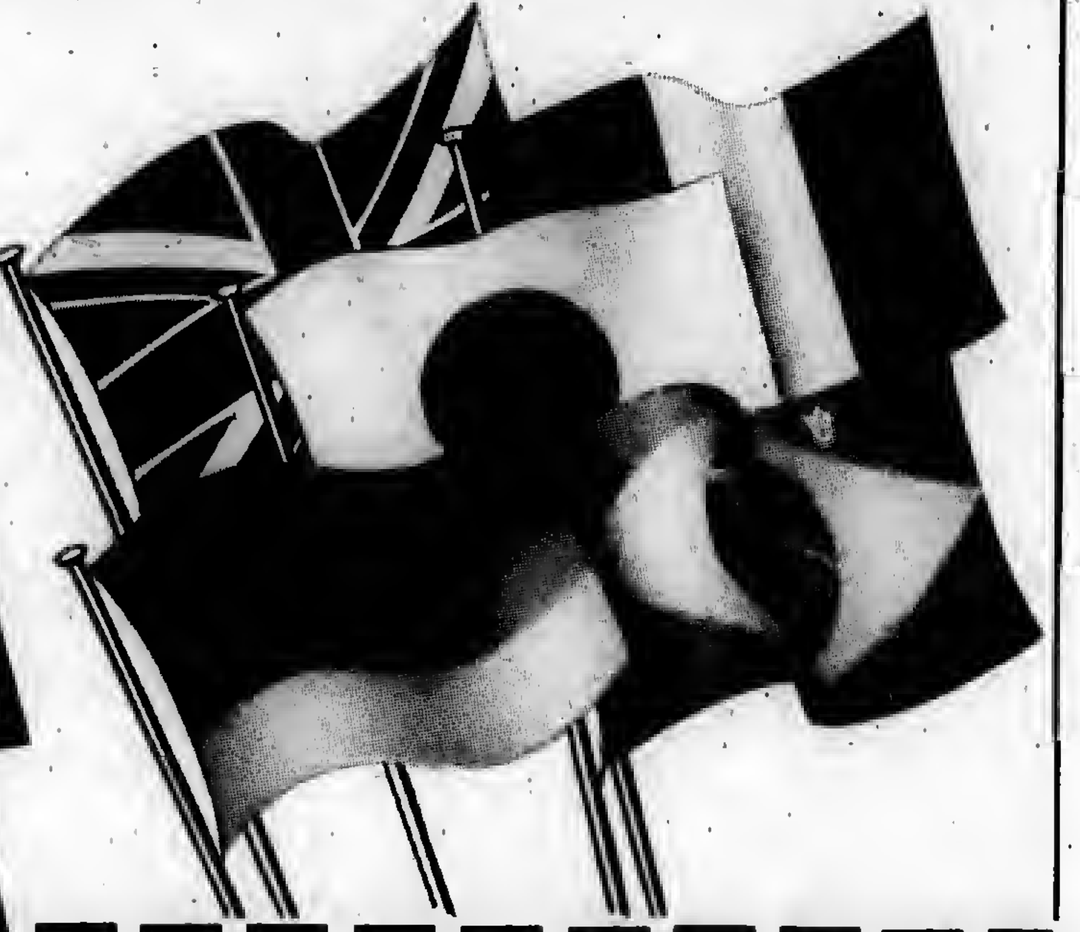

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Cybertek Wins Legal Battle Over Trade Secrets

By Tim Scannell
CW Staff

LOS ANGELES — A seven-year legal battle initiated by Cybertek Computer Products, Inc. against a former employee and a competitor for alleged unfair competition and misappropriation of trade secrets has been resolved in favor of Cybertek.

In a judgment issued by the Superior Court of California on Nov. 21, Pinckney Whitfield, a founder of Cybertek, was ordered to pay Cybertek $50,000 in damages and was prohibited from further disclosure of Cybertek trade secrets.

Tracor Computing Corp. (TCC), the firm named in the suit, was directed not to reveal Cybertek secrets and was specifically restricted from using those secrets without entering into a royalty arrangement, according to a court memorandum. The injunction also prohibits TCC from marketing its Trac 70 software system as a stand-alone unit for a minimum period of time, a spokesman said.

In the suit, Cybertek argued that both defendents knowingly used trade secrets from Cybertek's Auto/Issue system in TCC's Trac 70 configuration. Both systems are used to automate the issue process for life insurance companies, a spokesman said.

The dispute essentially arose when Whitfield, a founding officer of Cybertek, left that firm to join TCC in what was relatively the same field of endeavor, the court report said. While in his capacity as an officer at Cybertek, he had directly participated in the design and development of an on-line business computer unit known as the Auto/Issue system, according to the report.

Nondisclosure Agreement

While at Cybertek, Whitfield also entered into a nondisclosure agreement that stipulated that the techniques and methods relating to the Auto/Issue system were confidential and that he would not release any information about said system, the report stated.

It was Cybertek's contention that Whitfield, as an employee of TCC, directly aided in the design and implementation of the Trac 70 system, which is reportedly based upon Cybertek Auto/Issue trade secrets. Whitfield's former employer declared this was in direct violation of the nondisclosure agreement that was signed by him while at Cybertek, the report said.

The matters that were left to the court to decide were: 1) whether the Trac 70 system was similar to the Auto/Issue and 2) whether an employee is legally bound to a nondisclosure document when he leaves an employer. Before any decisions could be made, however, the court had to determine just what constituted a trade secret, the report noted.

Both defendants claimed that in this instance they were not dealing with trade secrets or confidential matter but merely well-known DP concepts. However, the court, along with several experts, agreed that "the specific implementation involving a particular combination of general concepts may well amount to a trade secret."

The court elaborated on this by stating that "the entire bundle or combination of these concepts as developed and utilized by the plaintiff (Cybertek) in its Auto/Issue system do constitute trade secrets which are protectable under the circumstances."

The court, having established what a trade secret is, then found Whitfield guilty of misappropriation, the report stated. It found that "there were significant design choices" that were copied and "that documentation need not be taken in order to establish liability, since appropriation by memory alone" is sufficient.

TCC was also found guilty because it was discovered that the firm was notified by Cybertek of the agreement signed by Whitfield but continued with Trac 70 production, according to the report.

In addition to the fine, Whitfield was also restricted from using any company's trade secrets, other than TCC, for a period of five years, the report added.

Executive Corner

- LeRoy M. Schreiner has been named vice-president and center manager of National Sharedata Corp., the Western Union Teleprocessng division.
- Manuel Garcia has been appoined senior vice-president of NCR Corp.
- Vico E. Henriques has been named president of the Computer and Business Equipment Manufacturers' Association (CBEMA).
- Donnamaie E. White has been named director of engineering at Telefile Computer Products, Inc.
- John McShea, a Rockville, Md., businessman, was installed as president of the North American Telephone Association (NATA).
- Donald A. Savitt has joined Pertec Computer Corp. as manager of engineering in the Microsystems Division.
- Ray Brooke has been named flexible disk program manager in Pertec Computer Corp.'s recently formed Microsystems Division.
- James Robson has been appointed vice-president, European Marketing Divison, Wabash Tape Corp.
- Stanley J. Murawski has been pomoted to the newly created position of product manager, Operations Division at Boole & Babbage, Inc.
- Edward J. Zander has been named manager of a newly formed microproducts marketing group at Data General Corp. Also joining the group as senior marketing specialist is Richard Pleau.
- Thomas R. Foley has been elected president and chief executive officer of Infoton, Inc.
- Paul R. Kemp Jr. has joined Calma as vice-president of sales. Robert L. Sayles has come to Calma as vice-president of operations, a newly created post.
- Levon M. Berberian has been appointed staff vice-president, marketing of RCA's Corporate Staff.
- Horst Enzelmeller of Frankfurt, managing director of Tandem Computers, GMBH in Germany, has been named a vice-president of Tandem Computers, Inc., as has Charles Ryle of Dallas, director of the company's sales in the Western U.S.; George Eckert, Stamford, Conn., director of the Eastern Region; and Dave Mackie, product management and technical support activities.
- Peter M. Kopkowski has been appointed vice-president of finance for Computer Automation, Inc.
- Anthony P. Cipolla has been promoted to vice-president of Product Engineering for Monroe Calculator Co.
- Frank Berk has been named vice-president of marketing for Logical Machine Corp.
- John A. Hill has been elected president of Megadata Corp.'s board of directors.
- Albert J. Risso has been named a managing partner and vice-president for Computer Partners, Inc.
- Michael R. Coffman has been promoted to vice-president, manufacturing at Datapoint Corp.
- Joseph G. Degen has been elected senior vice-president, finance, of Datapoint Corp.
- John C. Lewis, recently named president, has been appointed to the board of directors at Amdahl Corp.
- Colin J. C. Jarman has been named vice-president, European operations, for Scandata Corp.
- Norman B. Petersen has been appointed vice-president in the Marketing Division of Storage Technology (STC). A seventh director, Fred Buelow, has been added to STC's board.
- John Acker has been appointed vice-president, quality assurance, at Applied Magnetics Corp.

Contracts

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- Interface with development team throughout product development cycle
- Participate in final product test at customer site
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Here in Dayton, you'll find a city that's known for all its cultural, recreational and educational advantages but still manages to maintain a friendly small town atmosphere. Add to that the exceptional earnings and benefits package and outstanding growth opportunities we offer and these positions represent an exciting career opportunity.

Interested candidates should send a letter or resume in confidence, to:

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Positions available in most major cities. Cliant offers an outstanding salary and benefits package with rapid advancement potential.

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You'll be joining a financially sound company that has 26 years of solid growth behind it ... growth in dollar volume (we anticipate $200 million in sales this year), growth in personpower (we've increased our staff fivefold to 3600 since 1971) and growth in leadership (we lead the field in state-of-the-art in minicomputer and word processing systems). The atmosphere at WANG is fast-paced, demanding and very rewarding in terms of job satisfaction and recognition. If you are a real contributor, your place is at WANG.

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Senior compiler designers as well as intermediate compiler implementors are needed to develop compilers and interpretors for our new virtual memory computers. Opportunities to work on COBOL, BASIC, PL/1 RPG II, FORTRAN, WIPL, data base query and report languages.

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Manager Professional Recruiting
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Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2580
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W 7th Ave
Miami, Florida 33169

HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 800, 3250 Wilshire Blvd
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
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801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N J 07079

NEW YORK
Botal Associates, Inc
405 Lexington Avenue
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207 Fox Lane
Wallingford, Pa 19099

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106 Lawyers Building
428 Forbes Avenue
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The Computer Resources Group
Agency, Inc
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc
(Agency)
2530 James Street
Syracuse, New York 13206

WASHINGTON, D.C.
ESP Systems Corporation
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1211 Connecticut Avenue N W
Washington, D C 20036

SCHOOL OF
BUSINESS ADMINISTRATION
CALIFORNIA STATE UNIV.
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Tenure track appointment available, Fall 1978 semester: Coordinator of Instructional Computing. Supervises laboratory; assists faculty in use of computers for classroom use; assists in designing courses and degree options with computer applications. Must have thorough knowledge of COBOL and FORTRAN.

Ph.D. or D.B.A. required. Preference will be given to persons having professional level experience. For purposes of retention, tenure and promotion, heavy emphasis will be placed on teaching effectiveness, scholarly and creative achievements, and service to the University and community. Appointment effective August 25, 1978. Salary and rank commensurate with background and experience.

Send resume to Dr. Seymour Marshak, Dean, School of Business Administration, California State University, Long Beach. Closing date: January 15, 1978.

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Associate or Assistant Professor in Computer or Information Science starting March 23 or Sept. 1, 1978. Completion or near completion of Ph.D. in Computer Science or a closely related area required. Duties include teaching programming languages as well as other upper and lower division courses and curriculum development. Salary competitive. Send application, including vita, transcripts and three letters of recommendation, to Dr. William G. Stokes, Chairman, Dept. of Math and CSC, Austin Peay State University, Clarksville, TN. 37040. Closing Date: March 1, 1977. APSU is an Affirmative Action/Equal Opportunity Employer.

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Applicant must have a degree and two to three years work experience in business or finance accounting using the COBOL Language. Experience working with Data Base operations, package maintanance, programming, and some systems development. Minimum salary $12,460. Send resume to Julia Pietruszewski, University Personnel Services, University of Louisville, 105 W. Brandeis, Louisville, KY. An Equal Opportunity Employer.

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DATA SYSTEMS SPECIALIST. Will be engaged in studies of division operations and planning requirements for ensuring systems effectiveness. Requires MBA/MS Data Processing.

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(1) Minimum 4 years experience in computer aided design, including software applications, graphics peripheral and computer architecture. Outgoing personality and sales ability is essential and in heavy customer interface. Requires MS/CE or EE.

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(3) Will be involved in the design and development of real-time assembly language programming of military applications. Experience in assembly language programming and an understanding of electronics is essential. Naval tactical data systems/military software experience desirable. Requires BS Sciences.

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Dynamic and growing computer manufacturer requires exceptional individual with a minimum of 6 years or more experience in the repair and maintenance of data processing equipment such as minicomputers, disk drives, magnetic tape drives, line printers, and other related peripheral equipment. Must have a minimum of 2 years formal technical training.

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The Dayton areas largest and most progressive financial institution has openings for experienced Programmers and Systems Analysts.

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We are a rapidly growing international organization, active in the development and application of new systems and software technology. We offer an opportunity for professional growth, coupled with excellent sterling salaries and outstanding benefits. Please send resume to Sally Jablon Silver, SofTech, Inc., 460 Totten Pond Road, Waltham, MA 02154.

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Ph.D. required. Responsibilities include teaching and research. Preference will be given to specialists in DBMS and TP systems or mini-computer and micro-computer technologies. Rank and salary dependent upon qualifications. Starting date September 1, 1978. Application deadline January 1, 1978. Submit applications to Personnel Office, East Tennessee State University, Box 2407A, Johnson City, Tennessee 37601. An Equal Opportunity, Affirmative Action Employer M/F.

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SYSTEMS MANAGER

Fortune 500 manufacturer located in Indiana requires strong systems manager. Applicants must have extensive job shop mfg systems experience, good large scale project management track record, comprehensive on-line system design and implementation background, and preferably some data base familiarity.

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Send resume to President

CUNADATA CORP.
6902 Odana Road
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One Computer Systems Analyst, NM(GS) -12 and two Computer Programmer, NM(GS) -11

needed by the Panama Canal Company, a U.S. Government agency in tropical Canal Zone. Analyst must have had a minimum of two years' experience in detailed analysis and planning of business data processing applications using modular design and programming techniques and a minimum of two years' experience in COBOL programming. Programmer must have had at least two years' experience in data processing and COBOL computer programming. Entrance salary is $25,165.45 a year for analyst and $20,996.70 a year for programmer (includes 15% tropical differential). Positions are in the career federal service. Applicants must be citizens of the United States. Benefits include free transportation to the Canal Zone for appointee, eligible dependents and household goods; free shipment of automobile from New Orleans to the Canal Zone; approximately two months' leave earned annually; round-trip transportation to U.S. place of residence every two years; U.S. Government operated schools from kindergarten through junior college; Government sponsored life and health insurance programs; U.S. Civil Service retirement benefits; year-round tropical climate; and opportunities for economical tourist travel to Central and South America, and some Caribbean countries. Airmail Personal Qualifications Statement (SF-171, available in some post offices or Government agencies) or inquiry to: Chief, Personnel Operations Division; Box 2012; Balboa Heights, Canal Zone; Attn: Chief, U.S. Recruitment Section, Dept. CW

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Must be experienced in systems support of the B-6700 computer and be eager to learn other systems on site. Major effort includes support of:

- B-6700 Multi processor system
- Data communications network
- Large on-line data base using DMS II

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Bachelor's Degree with 3-5 years of advanced systems design and programming experience with the following background:

- COBOL, ALGOL and/or PL/1 desirable
- Data base and on-line systems experience
- Experience in financial retailing or manufacturing industry

Excellent income, comprehensive benefits, relocation assistance, and the advantages of our midwestern lifestyle await you. Join Technicolor Graphic Services, Inc., Hollywood, California, for an exciting career opportunity at the EROS Data Center, FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR ADDITIONAL INFORMATION, SEND RESUME TO:

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The Denver, Colorado office of Mathematica Policy Research, a research and consulting firm is seeking systems analysts. Minimum requirements include:

- 2-3 years of systems design experience with major emphasis on large, complex file structures
- 2-3 years of programming experience
- 3 DBMS, teleprocessing and/or mini-computer experience helpful
- Ability to communicate well verbally and write clearly
- Prior consulting experience, a plus.

If you meet or exceed these requirements, please send your resume, including salary history, to:

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Exxon is seeking an individual with a B.S. or M.S. Degree in Computer Science (or related discipline) and a minimum of 2 years data base experience that includes IMS-DL/1 or TOTAL hands-on experience. On-line applications experience is desirable; the programming environment is PL/1.

Candidates must also have good analytical skills, be experienced in technical evaluation of software and systems programming, and capable of making carefully thought-out recommendations. Good presentation and writing skills are important.

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We also seek a Programmer with an Associate Degree in Computer Science, or with equivalent experience, who meets the following requirement:

- 2 years IMS application programming experience
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- good written and oral communications skills.

A knowledge of IMS/VS DC facilities is desirable, but not essential.

We offer salaries commensurate with background and experience. The successful applicants can look forward to comprehensive benefits and long term career opportunities with Exxon.

For prompt consideration, please send resume and salary history in confidence to: Mr. Paul E. Pride, Exxon Corporation, P.O. Box 153, Florham Park, N.J. 07932.

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Software:

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Applications:

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Environment:

Life, Casualty, Variable Life

Experience:

2 or more yrs. programming, design, consulting, installation, development, project management, systems programming.

Location Desired

New England, Middle Atlantic, Midwest, Southeast, Southwest

Salary Range:

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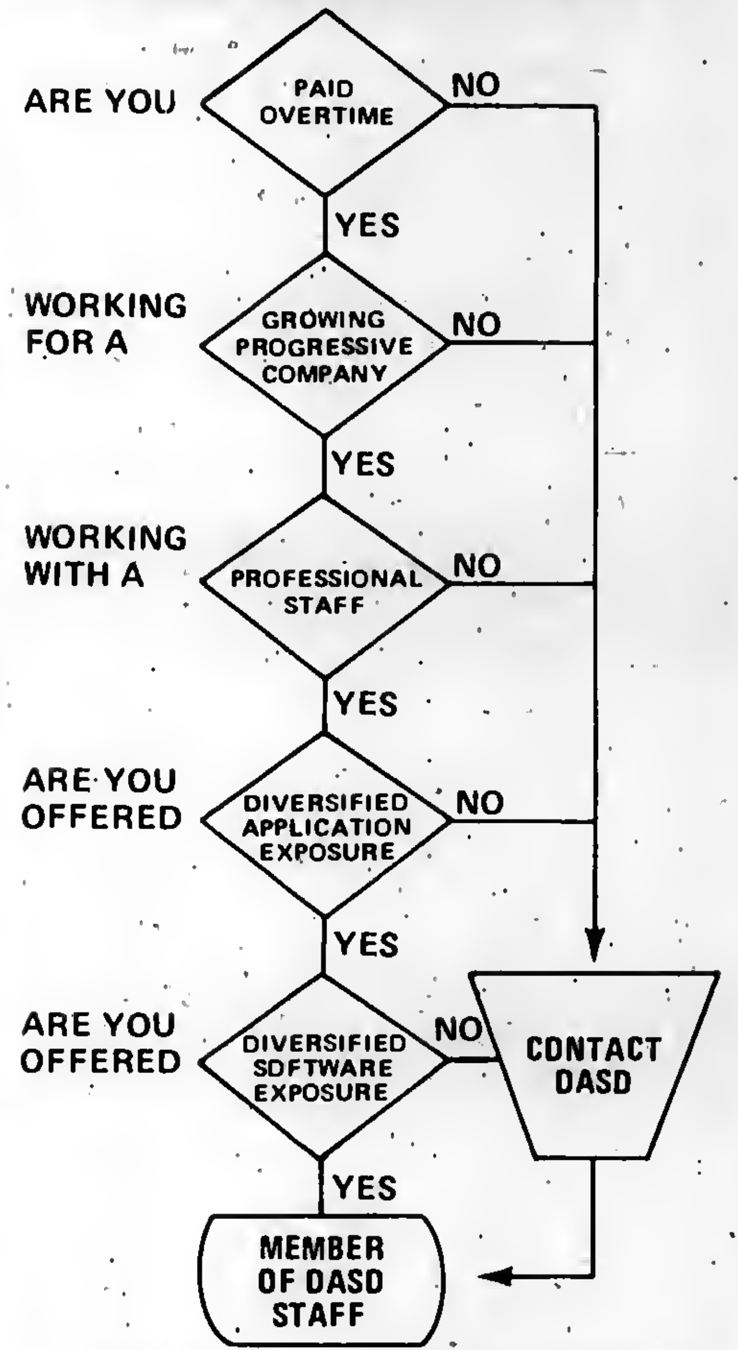

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Houston, TX 77027
(713)960-9102

KANSAS CITY
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6805 Metcalf
Shawnee Mission
Kansas 66202
(913)236-8288

TULSA
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DATA PROCESSING CAREERS

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A leading software consulting firm specializing in pension and insurance applications. Develop major on line systems for insurance companies using large IBM 370's. Must have insurance exp and willing to travel up to 60%. Great opty to grow with this company. Advance degree a plus.
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Requirements: Minimum of a bachelor's degree in computer science or related field with three to four years experience as a programmer/analyst with some statistical background. Knowledge of Burroughs and DEC machines. Fortran, Cobol and SPSS required. Must have good verbal and written communication skills. Responsible for the coding and testing of systems designed for institutional research and financial planning. Independent work and judgment in the design of systems and the analysis of data required. Also responsible for analytical assistance and statistical support for administrative and academic departments of the University. Available immediately. Send resume and required salary by December 15 to: Mr. Anthony Graziano, Office of Institutional Research and Financial Planning, 308A Hullihen Hall, University of Delaware, Newark, Delaware 19711:

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(512) 452-5247

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Please contact:

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Manager, Data Processing
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(609) 667-4488

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Blue Bell, Penna. 19422
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- Must have developed & implemented at least two unrelated systems.
- Systems experience must relate to computer applications at the IBM-370-135, NCR-C-201 or similar level of EDP equipment.

Write a one page summary of your education and experience background and state your salary requirement. Send to Lois Donalds or call (612) 331-6030 for an application.

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Responsibilities will include providing systems and applications programs for the plant process monitoring computers. Additionally, you will provide assistance to plant staff in the use of computer facilities.

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Salary depends on ability and experience. Benefits are comprehensive. Location is excellent. If you qualify, send your resume to: Arista Manufacturing Systems, A Xerox Company, P.O. Box 12849, Winston-Salem, North Carolina 27107. ATTN: John Sari.

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Requirements include 6+ years in programming (to include 4+ years in ALC) and 4 years experience in Telecommunications. Experience in systems analysis, design and MVS required; working knowledge desired in BTAM, Binary Synchronous Communication Line, protocol (multi point & point-to-point), IBM 3270, VSAM. Experience with IBM 3705 and BS/CS or related field helpful.

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(313) 326-7010

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Analysts/ Programmers

Minimum of 2 years experience in business applications in an IBM370 environment.

Please send resume to the appropriate address above.

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Minimum 3 years experience in software programming on large scale systems including some MVS, JES II, & VM/370 experience

Applications Programming
Minimum 2 years experience programming COBOL and/or BAL for large scale IBM business or financial applications.

EDP Auditor
Minimum 1 year experience in bank EDP audit.

DP Generalist & Long Range Planner
Minimum 10 years experience preferably including: systems analysis, data base design, equipment evaluation, systems software & applications programming, DP Operations and data control, as well as report writing from technical analysis to conceptual presentation. Engineering or contract negotiation experience a plus

Please send your resume and salary history to:
L.R. Mast, 611 N. Brand Blvd., Glendale, CA 91203
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SECURITY PACIFIC BANK

COMPUTER ANALYST:

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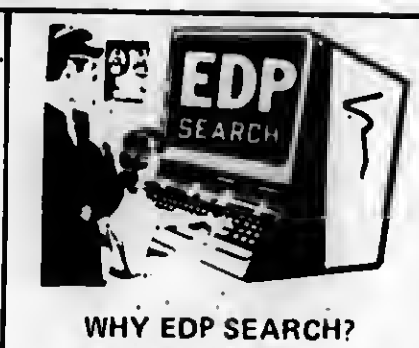
Please send confidential resume to: Dr. John M. Tyler, Louisiana State University, System Network Computer Center, Baton Rouge, Louisiana 70803. An Equal Opportunity Employer.



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In 1976, for example, 1,218 different companies ran ads in *Computerworld* to look for computer people. This list of advertisers includes just about every type of organization you can think of – and some you might not. Here's a small sample of 1976 recruitment advertisers in *Computerworld* and the type of positions they were filling:

Companies: Honeywell Information Systems, Borden, Marathon Oil Co., Lockheed, The City of Chicago, Sperry Univac, Digital Equipment Corp., Dartmouth College, Princeton University Plasma Physics Laboratory, Data General, Amdahl, Exxon, Gould Instrument Systems Division, Xerox, National Semiconductor, The Chicago Board Options Exchange, ITT Domestic Transmission Systems, Inc., United Brands Co., New England Mutual Life Insurance Co., Greyhound Computer Corp., GenRad, W.R. Grace & Co., Firemen's Fund American Insurance Co., Datapoint Corp., National Bank of Alaska, Schering-Plough Corp., Rockwell International, Massachusetts Institute of Technology, Merrill, Lynch, Pierce, Fenner & Smith, Inc., Booz, Allen & Hamilton, Inc., Levi Strauss & Co., Kawasaki Motors Corp., AMF Harley-Davidson, Winnebago Industries, Crown Zellerbach, University of Illinois, The American Bar Association, Flour Corp., Parke Davis, Tennessee Valley Authority, Westinghouse Computer & Instrumentation Division.

Positions: Systems Software Development, Software Analysts, Systems Programmers, Computer Performance Evaluation Specialist, Information Processing Professionals, Mainframe Sales Representatives, Manager, Corporate Information Processing, Computer Scientist, Senior Systems Programmer, Computer Systems Gurus, Professional Large Scale Computer Systems Sales, Computer Sciences/Data Base Engineer/Programmer, Engineers and Programmers for Logic and Systems Design and Testing, POS Applications Analyst, Manager of Floor Operations Support, Computer Communications Network Development, EDP Technical Support, Systems Software Programmer, Computer Leasing Sales, Senior Systems Analyst, Operations Manager, Senior Computer Consultant, Manager of Advertising and Public Relations, Data Processing Manager, Scientific Programmer Analysts, Senior Analysts, Director of Computer Services, Data Base Administrator, Job Set-Up Coordinator, Head of Information Services, Executive Director, Director Computer Services, Distributor Sales Manager, National Marketing Manager, Director of Systems and Operations, Director of Academic Computer Services, Manager of Systems and Programming, Developer of Management Information Systems, Computer Software Scientist, Biomedical Computer Engineer, Computer Services Manager.

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Here's what three recruitment specialists have to say about their advertising in *Computerworld*

"*Computerworld* is more dependable than a local newspaper. First of all, when you go into a city paper you're only going to reach the percentage of the population in that area that are data processing people. And secondly, you're only going to reach the percentage of DP people who are reading the paper that day. But with *Computerworld*, we can depend on being able to reach qualified data processing people – maybe managers, programmers or analysts, but at least all people in our specialty. The response is quantitatively better as well. For instance, our first ad in *Computerworld* (for a Kansas City opening) got 45 responses, whereas a comparable ad in the Kansas City paper would have only gotten one or two."

Richard Kramer
President
Electronic Data Personnel
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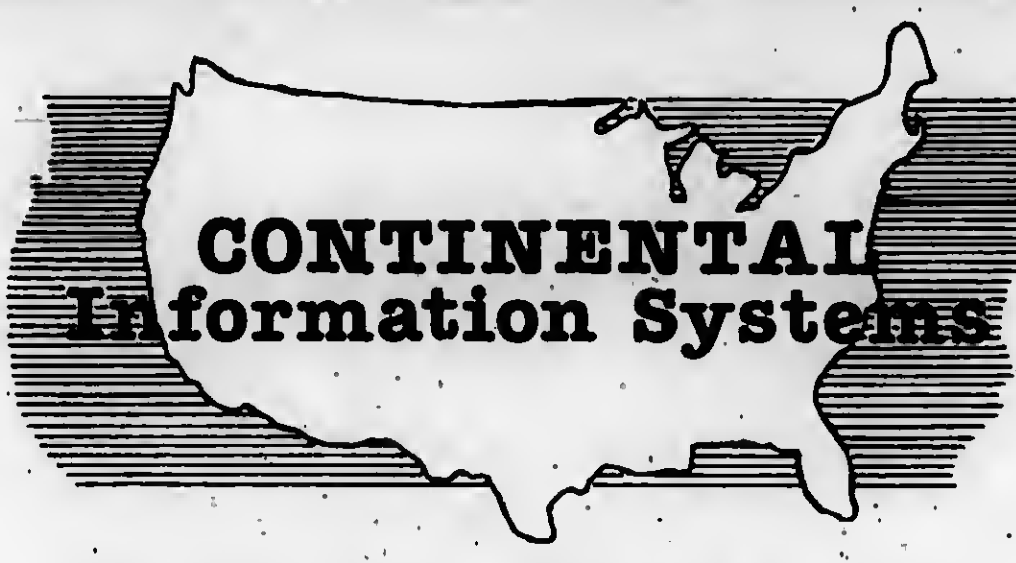

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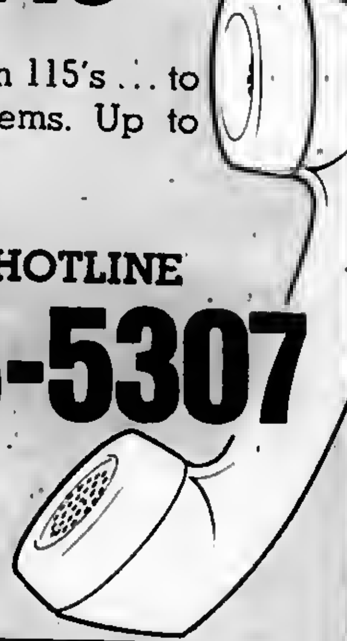

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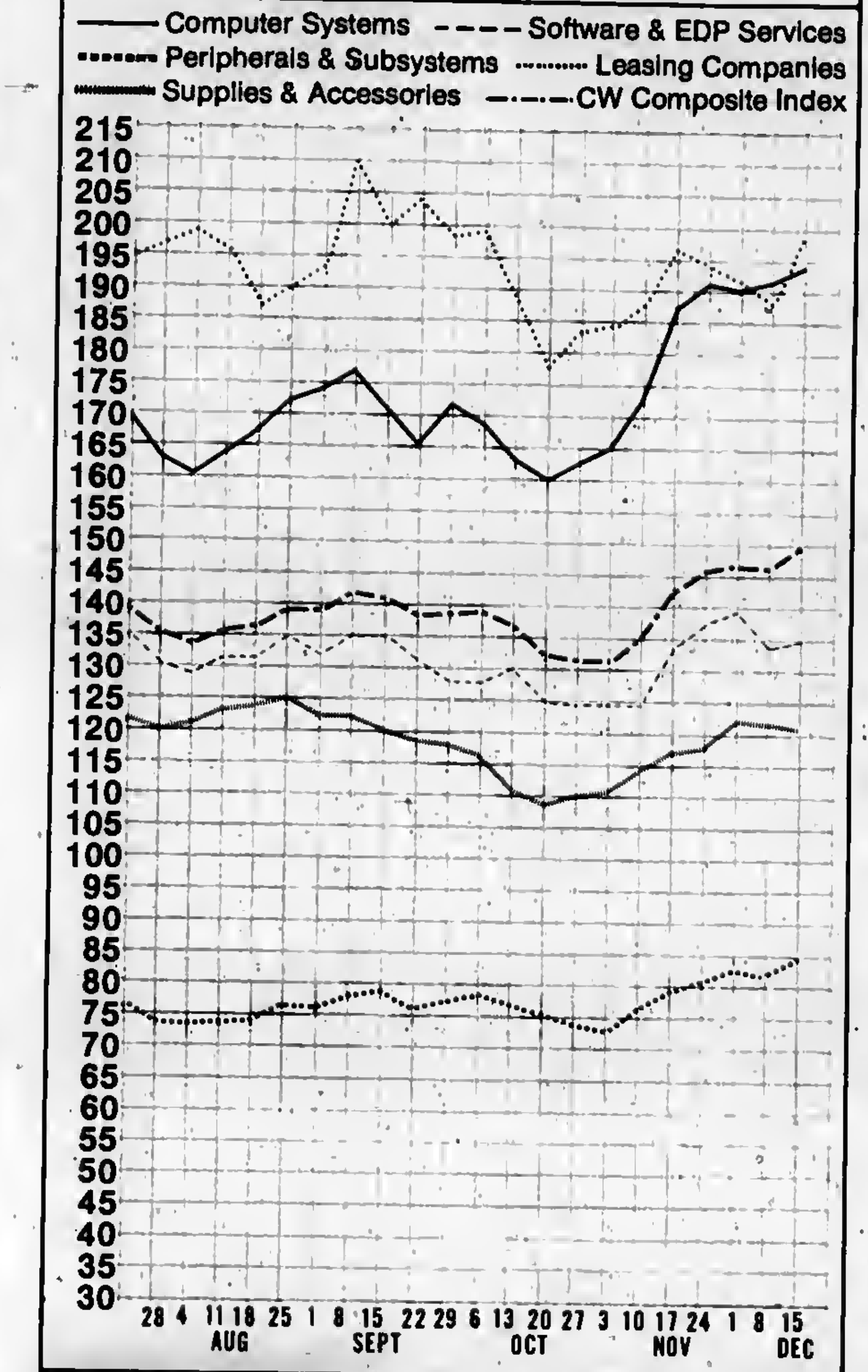

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6 Mo Shr	.20	.13
Revenue	2,212,400	1,829,900
Earnings	162,000	120,500

COMTEN
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.09	......
Revenue	9,013,000	$5,741,000
Tax Cred	59,000	......
Earnings	243,00	(219,000)
9 Mo Shr	.44	.09
Revenue	24,443,000	17,609,000
Tax Cred	329,000	74,000
Earnings	1,145,000	224,000

CRAY RESEARCH
Three Months Ended Sept. 30

	1977	1976
Revenue	$533,791	a.....
Loss	897,379	$415,573
9 Mo Rev	1,570,062	a.....
Loss	1,989,155	995,521

a-No revenue figure — company went public in March 1976.

DATA 100
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.20	$.28
Revenue	34,922,000	30,178,000
Tax Cred	183,000	373,000
Earnings	1,006,000	1,147,000
9 Mo Shr	.78	.98
Revenue	96,970,000	87,807,000
Tax Cred	478,000	658,000
Earnings	3,557,000	3,525,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 14, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE DEC 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 50	50 3/8	+4 7/8	+10.7
N	BURROUGHS CORP	55- 91	69 1/4	+1 3/4	+2.5
O	COMPUTER AUTOMATION	18- 30	27	+ 7/8	+3.3
N	CONTROL DATA CORP	20- 27	27	+2	+8.0
O	CRAY RESEARCH INC	15- 29	28 1/2	+2 1/4	+8.5
N	DATA GENERAL CORP	35- 54	48 5/8	+ 3/4	+1.5
N	DATAPOINT CORP	18- 41	39 1/8	+ 1/8	+0.3
N	DIGITAL EQUIPMENT	37- 53	44 7/8	0	0.0
N	ELECTRONIC ASSOC.	2- 3	2 5/8	- 1/8	-4.5
A	ELECTRONIC ENGINEER.	8- 13	12 7/8	+ 3/4	+6.1
O	FOUR-PHASE SYSTEMS	13- 21	20 3/8	+ 5/8	+3.1
N	FOXBORO	41- 54	48 3/8	0	0.0
O	GENERAL AUTOMATION	6- 9	6 1/2	- 1/4	-3.7
O	GRI COMPUTER CORP	1- 1	1/2	- 1/4	-33.3
N	HEWLETT-PACKARD CO	69- 87	71 3/4	+ 3/4	+1.0
N	HONEYWELL INC	43- 55	45 1/4	+ 1/8	+0.2
N	IBM	245-286	266 1/4	+5 1/4	+2.0
O	MANAGEMENT ASSIST	5- 10	10	+ 1/2	+5.2
O	MICRODATA CORP	7- 18	11 1/4	- 5/8	-5.2
O	MODULAR COMPUTER SYS	5- 9	8 3/4	- 1/2	-5.4
N	NCR	32- 47	39 1/2	- 1/8	-0.3
O	PRIME COMPUTER INC	12- 23	23	+1 1/4	+5.7
N	PERKIN-ELMER	17- 22	20 1/8	- 1/8	-0.6
N	RAYTHEON CO	16- 35	33 3/8	+1 3/8	+4.2
N	SPERRY RAND	30- 42	34 3/4	+1 7/8	+5.7
O	SYCOR INC	8- 20	20	+ 1/4	+1.2
A	SYSTEMS ENG. LABS	5- 11	11 1/4	+1	+9.7
A	WANG LABS.	10- 14	12 3/4	+ 1/4	+2.0

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE DEC 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 1/2	- 1/8	-2.7
O	BOOTHE COURIER CORP	8- 13	15 1/2	+2 5/8	+20.3
O	COMDISCO INC	10- 15	14 1/2	+1	+7.4
A	COMMERCE GROUP CORP	1- 3	3/4	+ 1/8	+20.0
A	COMPUTER INVSTRS GRP	1- 2	3/4	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 3	2 5/8	+ 3/8	+16.6
N	DPF INC	6- 10	8 5/8	- 1/4	-2.8
N	IIFL	13- 22	19 7/8	+ 5/8	+3.2
N	LEASCO CORP	19- 27	23 3/4	- 1/2	-2.0
O	LEASPAC CORP	1- 2	7/8	+ 1/8	+16.6
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 1/2	+ 1/8	+2.3
N	U.S. LEASING	10- 16	13 7/8	- 5/8	-4.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE DEC 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	9	0	0.0
A	APPLIED DATA RES.	5- 10	8 3/4	+ 1/2	+6.0
N	AUTOMATIC DATA PROC	23- 30	29 1/8	+ 3/4	+2.6
O	COLEMAN AMERICAN COS	2- 2	1 5/8	- 1/8	-7.1
O	COMPU-SERV NETWORK	9- 15	11 1/4	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	- 1/2	-5.2
O	COMPUTER HORIZONS	1- 1	1	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/4	+ 5/8	+6.4
N	COMPUTER SCIENCES	7- 10	9 1/2	+ 5/8	+7.0
O	COMPUTER TASK GROUP	1- 2	1 5/8	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMSHARE	5- 8	7 1/2	0	0.0
O	DATA DIMENSIONS INC	3- 5	3 3/4	0	0.0
O	DATATAB	1- 2	1 1/2	+ 1/4	+20.0
N	ELECTRONIC DATA SYS.	14- 20	15	- 5/8	-4.0
O	INSYTE CORP	2- 3	1 1/8	- 1/8	-10.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	+ 1/8	+10.0
A	LOGICON	7- 17	13 3/4	- 7/8	-5.9
A	MANAGEMENT DATA	1- 2	1 1/8	+ 1/8	+12.5
A	NATIONAL CSS INC	10- 16	14 7/8	- 1/8	-0.8
O	NATIONAL DATA CORP	4- 7	6 7/8	0	0.0
A	ON LINE SYSTEMS INC	16- 22	19 3/4	+1	+5.3
N	PLANNING RESEARCH	3- 6	4 1/2	- 1/4	-5.2
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 3	2 3/4	0	0.0
O	REYNOLDS & REYNOLD	17- 21	20	+ 1/2	+2.5
O	SCIENTIFIC COMPUTERS	1- 4	4	0	0.0
O	TYMSHARE INC	14- 23	23	+2	+9.5
A	URS SYSTEMS	4- 5	4 1/2	+ 1/4	+5.8
N	WYLY CORP	1- 2	3/4	- 1/8	-18.6

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE DEC 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 16	14 3/8	0	0.0
O	ADVANCED MEMORY SYS	7- 9	8 1/4	+ 5/8	+8.1
N	AMPEX CORP	8- 11	9 3/8	+ 1/8	+1.3
O	ANDERSON JACOBSON	3- 5	4 3/4	+ 1/8	+2.7
N	APPLIED DIG DATA SYS	10- 20	13 3/8	+ 1/4	+1.9
O	BEEHIVE INT'L	5- 12	5 1/2	0	0.0
A	BOLT,BERANEK & NEW	7- 9	7	- 3/8	-5.0
N	BUNKER-RAMO	8- 13	11 1/4	- 1/4	-2.1
A	CALCOMP	3- 5	2 7/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3 3/8	-	-1.8
N	CENTRONICS DATA COMP	19- 30	19 1/4	- 1/2	-2.5
O	COGNITRONICS	1- 4	3/8	0	0.0
O	COMPUTER COMMUN.	5- 8	7	- 1/4	-3.4
O	COMPUTER CONSOLES	4- 7	4 1/4	+ 1/2	+13.3
A	COMPUTER EQUIPMENT	2- 3	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	+ 5/8	+71.4
O	COMTEN	9- 13	10 7/8	0	0.0
N	CONRAC CORP	19- 28	23 3/4	+1 1/4	+5.5
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 11	10 1/8	+ 1/8	+1.2
A	DATA PRODUCTS CORP	9- 19	17	0	0.0
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 7/8	0	0.0
O	DECISION DATA COMPUT	2- 3	1 7/8	- 1/8	-6.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 11	10 1/8	0	0.0
O	DATARAM CORP	2- 24	23	+1	+4.5
N	ELECTRONIC M & M	4- 5	4 1/4	0	0.0
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 5/8	- 1/8	-7.1
N	HAZELTINE CORP	8- 12	10 1/2	- 1/4	-2.3
N	HARRIS CORP	28- 45	45 1/4	+3 3/4	+9.0
A	INCOTERM CORP	10- 19	18	+ 3/8	+2.1
O	INFOREX INC	4- 7	6 5/8	+ 1/4	+3.9
O	INFORMATION INTL INC	9- 14	9	0	0.0
O	INTEL CORP	38- 57	45	+1	+2.2
A	LUNDY ELECTRONICS	3- 6	3 5/8	- 1/4	-6.4
O	MSI DATA CORP	6- 14	14 1/4	+ 5/8	+4.5
O	MEMOREX	23- 34	31 7/8	+2 1/4	+7.5
N	MOHAWK DATA SCI	5- 8	6 1/8	0	0.0
O	PENRIL CORP	2- 5	5 3/4	+ 1/8	+2.2
N	PERTEC CORP	7- 11	11	+ 5/8	+6.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3 1/4	+ 1/8	+4.0
O	RECOGNITION EQUIP	6- 10	7 1/8	+ 1/8	+1.7
O	SCAN DATA	1- 2	1	+ 1/8	+14.2
O	STORAGE TECHNOLOGY	10- 21	20 3/4	+1 7/8	+9.9
O	T BAR INC	7- 13	12 1/2	- 1/4	-1.9
O	TALLY CORP.	4- 6	4	- 1/4	-5.8
A	TEC INC	7- 10	7 3/8	+ 3/8	+5.3
N	TEKTRONIX INC	29- 40	37 7/8	+1 1/4	+3.4
N	TELEX	2- 3	3	0	0.0
O	WILTEK INC	1- 1	1 1/8	+ 3/8	+50.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE DEC 14 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 3/4	- 1/8	-1.8
O	BALTIMORE BUS FORMS	1- 4	1 3/4	0	0.0
A	BARRY WRIGHT	10- 15	15 1/8	+ 5/8	+4.3
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19 3/4	+1 1/4	+6.7
N	ENNIS BUS. FORMS	6- 7	6 3/8	- 1/4	-3.7
O	GRAPHIC CONTROLS	13- 18	16 1/2	+ 1/2	+3.1
N	3M COMPANY	46- 56	46 3/8	- 1/8	-0.2
O	MOORE CORP LTD	24- 37	26 3/4	- 3/4	-2.7
N	NASHUA CORP	16- 28	19 1/8	- 3/8	-1.9
O	STANDARD REGISTER	18- 25	21 3/4	- 1/4	-1.1
O	TAB PRODUCTS CO	[illegible]	9 3/4	- 1/4	-2.5
N	UARCO	18- 22	20 1/2	+ 1/4	+1.2
A	WABASH MAGNETICS	10- 15	12 1/4	- 1/8	-1.0
N	WALLACE BUS FORMS	17- 21	20 1/8	- 1/4	-1.2

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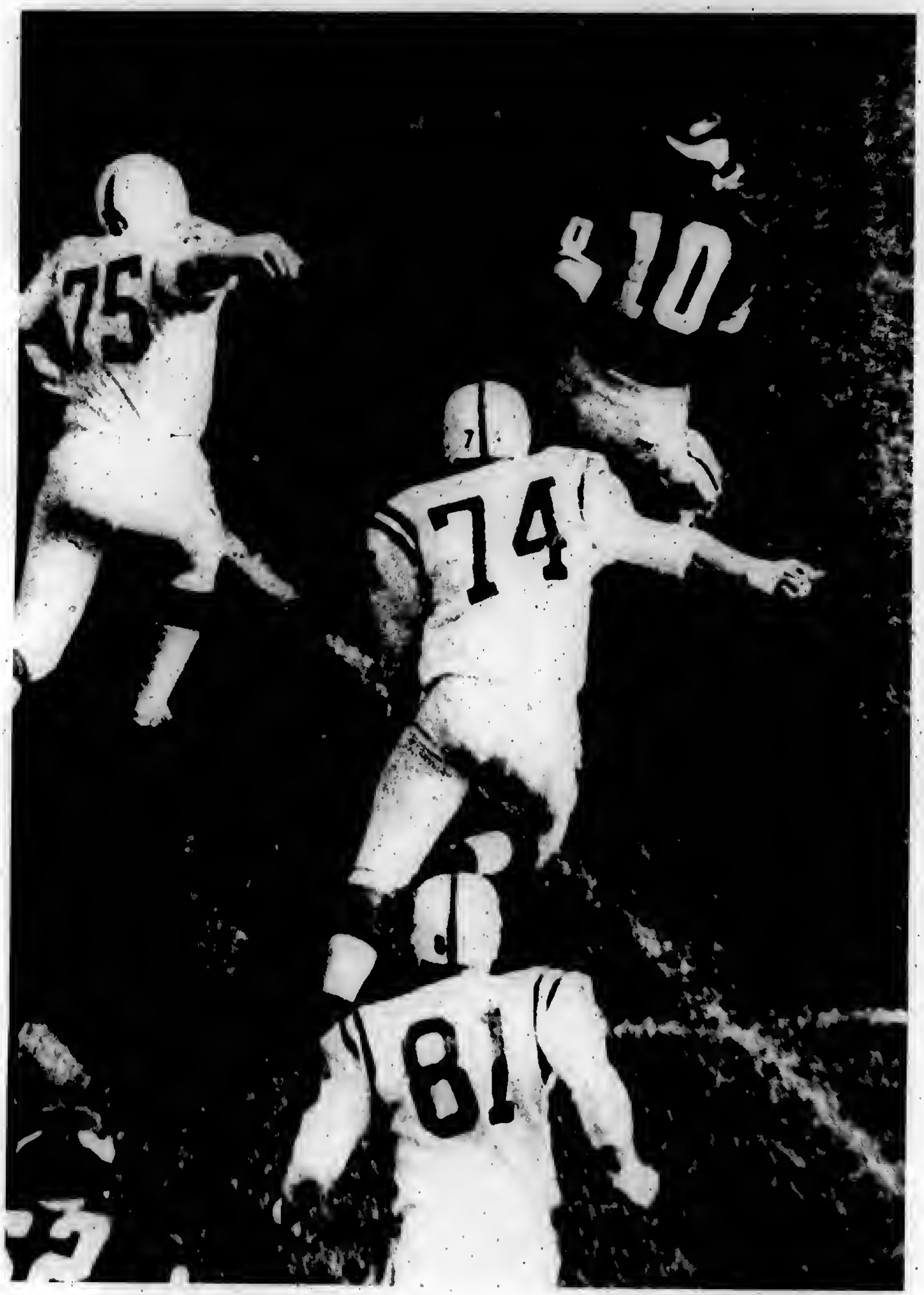

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NEWSPAPER

CW Photo by R. Frank

SBS' Linda Zier and Ralph Fairbanks participate in a simulated business conference in Harrison, N.Y. Freeze-frame video (on large screen) shows users in Houston; data on CRT terminal comes from a minicomputer also in Houston.

New Yorkers 'Meet' Texans At SBS Satellite Conference

By Ronald A. Frank
CW Staff

HARRISON, N.Y. — A different kind of business conference took place at the new headquarters of Texaco, Inc. here recently. The conference was held via satellite to resolve a "typical business problem" and it included participants in Harrison and in Houston, Texas.

The communications link between the two sites was part of the Project Prelude experiment being conducted by Satellite Business Systems (SBS) to demonstrate the future uses of satellite technology for data communications and other services [CW, Nov. 21].

The National Aeronautics and Space Administration (Nasa) authorized SBS to use the Communications Technology Satellite (CTS) to conduct experiments to demonstrate the feasibility of using satellite facilities to enhance business communications.

During the one-hour satellite demonstration at Texaco, high-speed data transmission, facsimile, video and freeze-frame video techniques were utilized, over a single integrated satellite channel. A Hewlett-Packard Co. Model 2648A graphics terminal in Harrison displayed data accessed from

(Continued on Page 6)

Equifax Tactics Unfair To Subjects, FTC Rules

By Nancy French
CW Staff

WASHINGTON, D.C. — Equifax Services, Inc., which develops reports about the personal lives of about 20 million Americans every year, has used "unfair and deceptive" practices in developing and disseminating that information, a Federal Trade Commission (FTC) judge ruled here recently.

The information the firm collects and sells becomes part of millions of computerized files that are used by the firm's business and government clients to evaluate applications for employment, credit and insurance.

The unfair and deceptive practices found by the FTC are violations of the Fair Credit Reporting Act (FCRA) and were committed by the firm in the course of investigating individuals' backgrounds.

Among the violations cited in the 300-page opinion, written by FTC Administrative Law Judge Theodor P. von Brand, were: failure to reinvestigate disputed information; disclosure of consumer investigative reports to unauthorized persons; inclusion of adverse information about consumers in reports even though it was outdated; and maintaining a level of production pressure on its investigative personnel that was inconsistent with accurate reporting, thus failing to adopt reasonable procedures to assure maximum possible accuracy in its reports.

Reports' Accuracy Defended

Equifax Services, Inc. and Credit Bureau, Inc. — the latter of which is a nationwide credit bureau that maintains computerized files on about 30 million American consumers — are subsidiaries of Equifax, Inc., which was formerly known as Retail Credit Co.

In a statement, W. Lee Burge, chairman of Equifax, Inc., expressed "strong disagreement" with the FTC ruling in this four-year-old case.

Burge said the judge's conclusions "appear to ignore the high degree of accuracy the company achieves in its reports and seem to be based on isolated instances in which individual employees may have violated company policy.

"Certainly our policies and practices are designed to assure full compliance and fair dealing and to quickly correct individual instances of noncompliance with immediate termination," he said:

Von Brand found that Equifax rated the performance of individual employees as well as branch offices largely on the amount of adverse information they reported.

Consequently, there was considerable pressure on individual employees to produce information that, in the case of insurance companies, for example, would cause them to either decline to write a policy or at least charge higher premium rates.

In addition, von Brand found that

(Continued on Page 2)

Complete System Security Seen as 'Rings' of Defense

By Nancy French
CW Staff

LONDON — Defenses against computer misuse can be grouped into a series of concentric rings much like the defenses of a medieval castle. Ranging from protective elements built into system software to external people-oriented security disciplines, each plays a role in total system security, according to Adrian R.D. Norman, a management consultant with Arthur D. Little here.

Since each method, or "ring," will have its special advocates within an organization, the DP manager must assess their conflicting claims and "assure he does not invest in a $100,000 software package instead of improving programming discipline or build a concrete fortress on an isolated island when a software lock would have been

(Continued on Page 4)

CW Special Report on Supplies and Security follows Page 28.

DP Finds A Home On the Range

By Jeffry Beeler
CW Staff

FT. COLLINS, Colo. — Until recently, few rodeo cowboys knew — or cared to know — much about computers. A typical bronco buster of the old school probably would have defined the word "bit" as an accessory that fits in a horse's mouth and "kilobyte" as a wound inflicted by a rattlesnake.

But calf roping and Brahma bull riding are no longer the simple diversions they were a few years ago, when all a rodeo cowboy had to worry about was saddling up the nearest available mount and hanging on for dear life.

Today, rodeo riding is big business, just like any other professional sport, and as the management and paperwork problems of life in the corral have increased, many cowpokes have discovered computers can be as useful as a pair of chaps or a trusty lasso.

Yes, DP has at last begun to find a home on the range.

One place where computers have recently proven helpful to cowboys is at Rodeo Communications of America (Rocom), a service firm here that specializes in entering competitors in rodeos organized by the Professional Rodeo Cowboys Association (PRCA).

Rocom uses a system that works much like a computerized hotel or motel reservations network. When a professional rodeo performer decides to enter a PRCA competition, he contacts Rocom headquarters by dialing a toll-free telephone number.

One of the company's 30 telephone operators notes the cowboy's name and registration information and forwards it to the data entry department for keying on an IBM 3742 terminal. The information then goes into the computer system, which reserves a spot for the cowboy in the event or events of

(Continued on Page 4)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Equifax Tactics Judged Unfair

(Continued from Page 1)

Equifax employees ere expected to meet quotas that restricted the amount of time they could spend on any one case. Given these circumstances, some employees completed reports by contacting unqualified sources, hurrying through interviews or failing to ask a full range of questions. Some also completed reports without corroborating information as well as falsifying sources when none could be found within the limited work period.

Although falsifying reports was against company policy, it was impossible for management to assure such practices were not going on, the decision said.

Equifax, in its statement, denied the firm's production requirements exceeded the performance that could or should be expected of employees, saying "quality control records plus studies by independent consulting firms clearly indicate otherwise."

Reinvestigation Procedure

As for reinvestigating disputed information, von Brand found that wherever possible, cases in which disputed information was of a subjective nature were assigned to a new investigator who reopened the case without seeing the original report. However, it was not always possible to assign a new investigator.

When the reinvestigation was assigned to the field representative who did the original investigation, he received production credit only if the customer was charged for the reinvestigation. However, the customer was not charged if an error was found in the original report.

The company's policy of not giving production credit in such cases resulted in field representatives' emphasizing information showing the investigator, rather than the data subject, was right.

In many cases, when consumers did not know they were entitled to a reinvestigation of claims — and thus failed to request them — they were not undertaken at all.

Equifax also provided information on consumers to persons whom it had no reason to believe intended to use the information for purposes authorized under the FCRA. This was done through its voluntary follow-up service and its monetary savings program.

Under the voluntary follow-up arrangement, Equifax employees furnished customers with additional adverse information about consumers who were the subjects of prior reports.

Monetary Savings Program

The Monetary Savings Program involved Equifax supplying its salespeople with information about the subjects of previously prepared reports.

The latter reports were used "as promotion devices to demonstrate the value of its reports," according to the findings.

The findings included testimony of many consumers whose rights were denied by Equifax employees. It also contained testimony of Equifax employees about their interviewing and reporting practices.

The decision is being appealed to the full commission by both Equifax, Inc. and the FTC administrative staff, although neither side was willing to detail its claims prior to filing.

Appeals are expected to be filed sometime after Jan. 15, because both have applied for an extension of the 30-day filing deadline. Resolution of the case could take months or even years since after exhausting administrative procedures, Equifax can appeal the case to the federal courts.

Equifax also has been ordered to cease and desist from:

- Misrepresenting the identity of its investigative personnel.
- Misrepresenting the sources of its information and the manner in which reports are prepared.
- Submitting consumer information to persons whom it has no reason to believe intend to use it for purposes permitted under the FCRA or from persons who have not specifically requested such information.
- Using consumer report information as reference information or as a lead in preparing any report other than a consumer report.
- Including information which under the FCRA is considered outdated.
- Inducing its investigative personnel to prepare a certain proportion of consumer reports containing adverse information.

The company was also ordered to conduct semiannual unannounced performance reviews of field representatives to determine accuracy of their reports.

In addition, in cases where adverse information was discovered, Equifax was ordered to include a special report indicating the name of the individual who supplied the information.

- Misrepresenting to any consumer his rights under the FCRA.
- Failing to disclose information in the file to an individual with proper identification.
- Failing within a reasonable period of time to reinvestigate disputed information.

Equifax Loses Maine Battle

AUGUSTA, Maine — A Superior Court here recently rejected a request by Equifax Services, Inc. for a temporary injunction against the state's new credit reporting law.

Justice Lewis I. Naiman's ruling earlier this month frustrated Equifax's efforts to prevent enforcement of the 1977 statute, which limits the sale of personal information by credit companies and forbids the collection of information on an individual's life-style, political affiliation, race, religion or philosophy.

The law was enacted by the Maine legislature in response to citizen complaints that Equifax, gathered information on the sex lives, religious convictions and political activities of those it investigated.

Equifax has argued that the Consitution gives it the right to collect and sell information and that facts about private lives are relevant in evaluating a prospective policyholder's potential risk to an insurance company or employer.

Naiman rejected the company's constitutional claim — a decision that drew praise from the sponsor of the state's credit reporting bill. But at the same time, Naiman invited the firm to test the constitutionality of the new law if it so desires.

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7. Simultaneous batch/on-line library access	NO	**YES**
8. Full compression of program libraries	NO	**YES**
9. Fully-compatible online/batch functions	NO	**YES**
10. Tape library support in batch	NO	**YES**
11. Basic Mapping Support	Req'd.	**Not Req'd.**
12. Number of transactions for a typical session	16	**12**
13. CPU time for a typical session (seconds)	12	**9**
14. Number of EXCPs for a typical session	204	**99**
15. Number of characters transmitted per field	1520	**79**
16. Supports TP monitors other than CICS	NO	**YES**
17. Conversion programs supplied	NO	**YES**
18. Class A support	NO	**YES**
19. Installation support included	NO	**YES**
20. Training included	NO	**YES**

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Cowboys Learning 'Bit' Not Just Part of a Bridle

(Continued from Page 1)

his choice and selects a bull or bucking bronco for him to ride. For this service, Rocom charges $3.50 per rodeo.

Thus far, over 10,000 rodeo cowboys have subscribed to the service which Rocom President Bryan McDonald claims is the first of its kind in the world.

Built around a 9K-byte IBM System/32, the system also generates all the necessary paperwork for rodeo organizers, including an alphabetical listing of all the contestants in each competition and a detailed schedule of performances, McDonald said.

When it is upgraded next March to a System/34, the system will even generate PRCA membership rosters, oversee Rocom's billing and automate the assessment of fines against cowboys who fail to appear at rodeos where they are scheduled to compete.

Alternative to Hats

Before the system was installed in January 1976, cowboys entered rodeos through Rocom's lone reservations secretary, who recorded entries for all 600 PRCA events held each year across the country. During a typical working day, the secretary manually took 400 to 500 rodeo reservations, McDonald recalled.

Two days before each competition began, a stock contractor dispatched a field secretary to the host city to record the name of each contestant. A local rodeo judge then drew each name from a cowboy hat to determine the competitors' starting order and later repeated the procedure to select livestock for each cowboy.

On the following day, the contestants called Rocom headquarters to find out exactly when they were to compete and what animals they had drawn.

Under this system, reservations errors were common and clerical tasks like determining starting positions and selecting livestock often took 10 to 12 hours, McDonald said.

For the cowboys, the system also made rodeos difficult to enter because of Rocom's busy telephones. "A cowboy could spend six hours on the phone and never get through to our headquarters," he recalled.

In addition, cowboys often found themselves victimized by misunderstandings that arose during phone conversations between themselves and Rocom's secretaries. "If a cowboy thought he was supposed to compete at one time and a secretary thought he was supposed to compete at another time, he would spend a lot of money to get to a rodeo, only to discover that he had missed his event," the company president said.

Then, when a cowboy tried to explain to rodeo officials why he had arrived late, he had no record of his phone call to prove that he had received inaccurate scheduling information. "It was simply his word against the secretary's, and in such cases the cowboy always lost," McDonald said.

Since the system arrived here, however, most of these problems have disappeared, according to McDonald. For the cowboys, the system has nearly eliminated delays in accessing Rocom's reservations secretaries and has minimized scheduling mix-ups.

It has also discouraged preferential treatment in assigning livestock and thus given each rodeo competitor an equal chance to win.

For Rocom, the system has cut reservations errors and allowed company clerks to perform their random drawings "in a matter of minutes."

Largely because of these benefits, the computer system has received an enthusiastic reception from the cowboys who use it. "They're so nomadic that Rocom has become a kind of home for many of them," McDonald explained. "Often when they're on the road, they'll call us just to say hello."

In fact, the computerized reservations system has proved so popular with rodeo cowboys that the PRCA recently bought the service from Rocom.

"It's the one major thing that's happened to rodeos in the last 40 years," McDonald said.

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(Continued from Page 1)

adequate," he said.

Norman gave this advice at a recent security conference here sponsored by On-Line Conferences Ltd. of Uxbridge, England. He also provided users with an overall security plan.

Hardware Defenses

Redundant processing — achieved by use of parity bits — assuring the same results each time, is part of good hardware security, Norman suggested.

This is especially helpful in systems requiring "very high accuracy or where the consequences of an error are disastrous," he said.

In the area of telecommunications, Norman advised use of special codes containing large numbers of bits to accompany data sent across communications lines. These help detect the presence of errors and, if chosen suitably, can help locate the error in a long string of characters, he said. Even longer sets of check characters can actually be used to recreate the original message despite an error, he said.

As for software, Norman suggested that the system include a resident security officer who routinely checks the accuracy of the system, the authority of its users and the work it does.

It should also include procedures for recovering from breaches of security, whether they be accidental or intentional, he said.

The software should "identify the parts of the system hardware to restrict applications programs to those parts of the system they are authorized to use."

Secure software prevents one program from reading the contents of another with which it shares main memory, precludes one program from overwriting the files of another and checks to ensure that one terminal is not pretending to be another, he said.

The software also maintains the authorization tables that indicate what information shall be available to which user, he said. "If someone tries to do something he shouldn't, the surveillance system should raise an appropriate alarm," Norman said.

The applications programs can contribute to the accuracy of the system, but in all other respects constitute a threat, not a defense," Norman told his audience of users.

Physical Security

In the area of physical security, locks, bolts, fire detection and extinction equipment, guards and burglar alarms should be normal parts of the system's defense.

When possible, a computer should be located away from hazards such as buildings without proper fire protection, aircraft flight paths and roads with heavy vehicles.

There should be only one access route to the computer room, and emergency exits with panic bars should be openable only from the inside, he said.

As for the other measures aimed at fire and natural disasters, Norman pointed out that safes that prevent magnetic media from being "cooked" are available. To use a safe that will not preserve data against the worst conceivable disaster is merely a "wasted insurance premium," he said.

He also recommended use of hand-operated fire extinguishers to battle small problems so that employees will not be exposed to harmful extinguishing agents in addition to the danger from the fire itself.

As for electronic bugs on transmission lines, Norman reminded users that systems are easy to bug since telephone junction boxes and similar facilities are normally sited and constructed to simplify maintenance, making it "not difficult" for a knowledgeable intruder to install a tap.

'Procedural' Ring

Moving out to the "procedural" ring, Norman emphasized that here, segregation of responsibilities is the key.

Procedures should be followed during system development as well as operations to ensure that none of the systems staff has the opportunity to comprise security. In a secure commercial environment, as opposed to engineering, analysts should be prevented from writing the programs they describe, and programmers at terminals should never be allowed to operate the computer or run programs they themselves have written, he said.

When programs are ready for testing against live data, the tests should be conducted by a group that neither specified nor wrote the programs.

As for limiting the abuse of trust by people with authorized access to computerized information, Norman suggested controlling the amount and classes of personal data collected. Facts remain facts in the environment in which they were collected but they may be inappropriate in the context of the uses to which they are put. Soon this will be controlled by legislation, he pointed out.

No matter how trustworthy you may think an employee is, it is essential that he always be required to follow the rules that have been laid down for the installation.

U.S. Asks OECD Group on Transborder Data

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The U.S. has proposed that the Organization for Economic Cooperation and Development (OECD) create a body to consider the legal, economic and social issues of transborder data flows.

The first task facing the group would be to develop "guidelines for harmonizing national privacy laws," according to the State Department's Morris H. Crawford, who heads the Interagency Task Force on Transborder Data Flows.

Because as many as 13 European countries have been reported considering laws to restrict the flow of information across their borders, the enforcement of privacy in international DP must receive immediate attention from the OECD group, Crawford said.

If formed, the group would first examine the Council of Europe's draft convention governing international privacy, Crawford said. The 18 members of that council are also members of OECD.

White House Honing Privacy Position

The Privacy Protection Study Commission's final recommendations, released last summer, have undergone close scrutiny by a small team on the White House Domestic Policy Staff, and a Carter Administration position on privacy is expected late next spring.

Congressional interest will dictate which parts of the commission's work receive attention from the legislature and Administration first. At this point, the need for legislation concerning medical records and federal law enforcement access to bank records seem uppermost in congressional minds.

Others involved in developing the Carter Administration's views on privacy include Ron Plesser, former general counsel of the privacy commission, and Henry Geller, former general counsel for the Federal Communications Commission and the President's expected nominee for the new post of Assistant Secretary of Commerce for Communications and Information.

Geller Expected To Fill Two Posts

Henry Geller, who is expected to be President Carter's choice for Assistant Secretary of Commerce for Communications and Information, will also be the administrator of the National Telecommunications and Information Administration (NTIA).

The new administration within the Commerce Department resulted from the President's first reorganization plan, which calls for the merger of the White House Office of Telecommunications Policy with Commerce's Office of Telecommunications.

Geller's actual nomination and confirmation hearings are expected to be made and held by mid-February, sources close to the White House said.

NTIA's initial efforts will emphasize telecommunications. However, October 1978 will see an increase in the Administration's budget, permitting treatment of additional issues, such as transborder data flows, electronic mail, electronic funds transfer and privacy.

Washington Update

Booster of FBI Plan Quits Justice Post

WASHINGTON, D.C. — Peter F. Flaherty recently left his job as U.S. Deputy Attorney General to seek the Democratic nomination for the Pennsylvania governorship.

During the eight months he served as Attorney General Griffin B. Bell's right hand, Flaherty gave the Federal Bureau of Investigation permission to go ahead with its plans to develop a message-switching system.

The acting Deputy Attorney General, Benjamin Civiletti, is expected to be nominated by the White House to take over Flaherty's job permanently.

Administration Staffs DP Revamp Teams

The President's federal DP reorganization project has appointed several people to staff the teams that will examine DP in the government from many viewpoints.

Between 20 and 25 members of the public and private sectors are already "on board," according to Kenneth Allen, a staffer in the Office of Management and Budget's Information Systems Policy Division and a member of the reorganization project himself.

Among those appointed so far are Larry Dreeman, director of corporate information services at the Coca-Cola Co.; Robbin Hough, professor of economics and management at Oakland University; Philip Kiviat, technical director of the Federal Computer Performance Evaluation and Simulation Center; and Israel Feldman, director of the Reports Analysis and Statistical Operations Division at the Department of Housing and Urban Development.

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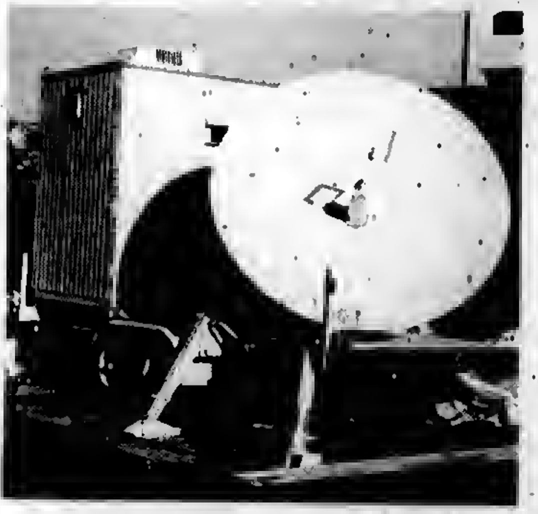
New Yorkers 'Meet' Texans Via SBS Satellite Experiment

(Continued from Page 1)

a data base stored in an HP 3000 minicomputer in Houston. The data was transmitted at 1.544M bit/sec using high-speed Harris Corp. modems.

HP 3000 systems used at both Texaco sites utilized standard data base and data entry software compatible with the experiment despite the high data rate, an HP spokesman said. The satellite transmissions used the 12- to 14 gHz frequency band with special portable 8-foot antennas built by Nasa.

Since the CTS was designed for experimental use by both Nasa and the Canadian Department of Communications, SBS said the demonstration was not a "preview" of SBS services. However, the frequency range and transmission rate were similar to those of the future services currently being described by SBS.



CW Photos by R. Frank

This experimental, portable earth station includes a eight-foot antenna constructed by Nasa to operate at 12- to 14 gHz. When such earth stations become commercially available, users will have rooftop access to satellite services.

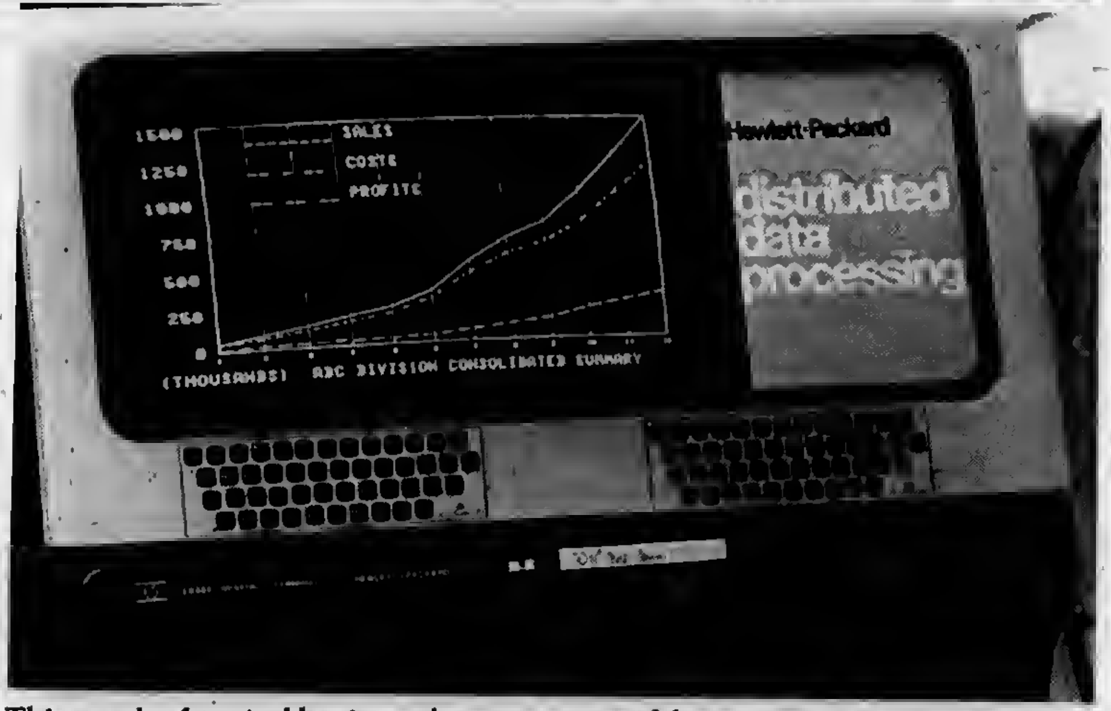
Project Prelude also includes demonstrations at corporate locations of Rockwell International Corp. Montgomery Ward.

In addition to SBS, eight vendors of DP and other equipment and services participated in the project. SBS refused to divulge costs of the satellite capabilities demonstrated.

Earth stations for the 12- to 14 gHz frequencies are not yet available commercially, although the HP systems and much of the other equipment used are generally available.

SBS plans to begin providing integrated satellite business services to users in 1981, according to current plans. Project Prelude will conclude early next year after demonstrations have been held at Montgomery Ward. Rockwell International sites were used for demonstrations in November.

At each location, users are being asked whether the demonstrated services would help make their normal business activities more efficient.


1500
1250
1000
750
500
250
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SALES
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This graph of typical business data was accessed from an HP 3000 minicomputer in Houston, transmitted at 1.544M bit/sec via satellite and displayed on this terminal in Harrison, N.Y.

Says Dukakis Interfered

Sci-Tek Blames Governor for Lost Work

By Ann Dooley
CW Staff

BOSTON — Sci-Tek Associates, Inc. lost a Massachusetts merit rating board contract — even though its bid was three times less costly than the winner — because of pressure from Gov. Michael S. Dukakis, the firm claimed recently.

"We're in a good legal position to dispute the decision because of the governor's public statements and private interference," Robert Orr, Sci-Tek spokesman, contended. "But we decided it wasn't in anyone's best interests to stop the procurement."

Sci-Tek's allegations stemmed from a recent statement by Dukakis that the company should not be involved in any state business. That statement was made after a state Attorney General's investigation cited Sci-Tek for improper conduct in another recent contract award — a $23 million Administration and Finance facilities management agreement [CW, Nov. 14].

Work in Mid-Stream

Sci-Tek had been working under a no-bid contract for the last six months installing the merit rating board computer system. "The company developed the system and could have simply continued with operations, whereas any other company would have to undergo an orientation period," Orr said.

Sci-Tek was ranked fourth out of seven contenders in the technical assessment phase of the bid evaluation process, but its cost proposal was three times less than that of Control Data Corp., which was awarded the contract.

All the reasons for the decision have not been disclosed yet, according to Orr, who added, "We can't say anything for a fact, but there are rumors" that Dukakis interfered.

"We hope there won't be continued problems with state contracts, but only time will tell," he said.

Denying any government interference, the governor's press secretary, Alan Raymond, said the contract award was made by merit and "the governor was not in touch with the selection committee at any time."

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U.S. to Draft Stand on Private-Line Charges

By Edith Holmes
CW Staff

WASHINGTON, D.C. — U.S. international carriers and multinational DP companies will meet this week to hammer out a U.S. position on efforts by European and Japanese administrations to end flat rates for private communications lines.

Representatives from General Electric Co., Control Data Corp., TRT and RCA and a member of the Commerce Department's Office of Telecommunications will be among those meeting at the Federal Communications Commission (FCC) on Thursday, Dec. 29 to draw up a U.S. contribution for Geneva meetings of the Consultative Committee on International Telephone and Telegraph (CCITT) scheduled for late April and early May.

The Italian government first suggested an end to flat-rate charges for transparent, leased circuits last February. The Italian proposal that the lines be priced according to the volume of messages sent over them gained support from several European countries and from the Japanese government during the May 1977 CCITT meetings [CW, May 16].

The U.S. National Committee of the CCITT, led by Earl Barbely of the FCC, registered its disapproval of Italy's idea during those meetings.

U.S. DP companies fear their leadership in offering DP services to the rest of the world will end if pricing for communications lines becomes volume-sensitive, drastically increasing international communications costs, Brendon McShane of GE said during a Dec. 15 meeting of the U.S. CCITT committee. He estimated the U.S. has 90% of the DP business abroad.

While they are more sympathetic to foreign administrations' desires to realize more revenue from their public communications networks, the U.S. international carriers do not want to lose the U.S. DP companies as customers abroad. The carriers do believe, however, that flat-rate charges must be phased out eventually.

C&W Contribution

Citing a contribution to the CCITT from Cable and Wireless Ltd. (C&W), John O'Boyle of ITT Worldcom called it "one of the better expressions of the worldwide feeling that flat-rate charges must be phased out." He told the committee he "would bet on an end to flat rates for private lines as the reality of the 1980s" and urged an acknowledgement of the fears the rest of the world has.

A milder variation on the Italian theme, the C&W contribution stated that "the major difficulty which has arisen in recent years with this method of charging [flat rates] has been the use of dedicated customer leased circuit facilities by users other than the customer."

The European and Japanese governments specifically fear that U.S. DP companies lease private lines from them for a flat rate and then turn around and use the communications channels, not for data processing, but as ordinary message conduits, members of the U.S. CCITT committee said in interpreting the C&W contribution.

Volume-sensitive pricing suggestions stem from the concern of foreign administrations that public traffic on their communications systems is being eroded through the actions of U.S. firms, C&W suggested, urging that the CCITT study this particular concern.

C&W would not support the Italians' reasons for wishing to eliminate flat-rate charging — that such pricing methods are out of date and that their original purpose was to relieve traffic pressure on Telex services.

The firm added the ominous note, however, that while it "would be unable at present to support any change in the monthly flat-rate charging principle as applied to customers using leased circuits for their own traffic," C&W would be interested in a study to refine the flat-rate system by examining the voice vs. data and the various speed relationships of leased circuits.

GE's McShane believes that the foreign administrations may try a "two-step" move to volume-sensitive pricing for private lines. The first step would be to price lines according to speeds.

Speed-sensitive pricing is already under way in Japan, McShane said, pointing to a decision earlier this month by the Japanese Ministry of Posts and Telecommunications to raise international voice-grade leased circuit rates as requested by the Japanese carrier, KDD.

Effective in April, KDD will abolish private-line service and establish speed-sensitive rates. Using prices of the 2,400 bit/sec line as a base rate, KDD will charge 10% more for 4,800 bit/sec and 20% more for 9,600 bit/sec lines.

KDD originally asked the Japanese ministry to approve increases in prices by 30% and 60%, respectively, for these higher speeds.

The Japanese have also offered discounts of 5% where six or more alternate voice data (AVD) lines are leased by a single customer. The monthly charges for leased telegraph services have also been reduced substantially, A.E. Schuamberger of RCA Globcom added.

By asking foreign administrations to document the problems they've had with DP firms, the U.S. has an opportunity to shape any study of these issues, R.F. Sabacek of TRT suggested.

Check It Out For Yourself

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IBM Seeks Two Trials in Catamore Round II

By Molly Upton
CW Staff

PROVIDENCE, R.I. — The second trial of IBM vs. Catamore Enterprises, Inc. should be separated into two trials, according to a motion filed by IBM.

In its petition to the U.S. District Court for the District of Rhode Island, IBM asked for a separate trial of the issue of whether the 1969 written agreement between the two firms for IBM systems engineering services (SES) can be voided by Catamore and, if so, whether the contract was rescinded duly and in a timely manner.

At issue is Catamore's claim that fraud by IBM voids the SES agreement and its limitations.

SES Agreement

The SES agreement indicates it supersedes all other agreements and also carries with it a statute of limitation of one year, which the appeals court cited in ordering a new trial.

The appeals court's order for a new trial overturned a jury verdict ordering IBM to pay $11.4 million in damages and Catamore to pay $68,453 in back rent.

IBM had sued the jewelry firm, a first-time user, for the rent and Catamore countersued, charging IBM with breach of contract, breach of warranty, fraud and negligence.

If IBM's claims are determinative, then splitting the trial issues will have saved all concerned much time and effort, IBM said.

Catamore Objects

In its own brief, Catamore objected to the separate trial, asking for more time in which to formulate its reply. The jewelry firm stated a separate trial and the resulting multiplicity of issues will only further protract the matter and waste court time and resources.

The Catamore brief also stated Judge Francis J. Boyle had indicated his intention not to order a separate trial on any issue if either of the parties objected.

IBM contends that issues in the initial trial are relatively simple to comprehend and rule upon. Thus the separate trial would "substantially reduce the grave risk of jury confusion inherent in a trial on all the issues herein involved," the petition stated.

Catamore acquired a System 360 from IBM and engaged the firm to aid in systems design, initially through oral agreements and later through the written SES agreement.

IBM said in its petition that "the court will appreciate that Catamore's argument amounts to nothing more than a contrived and wrong reading of a document, attempting to twist 'system design for production control' into an imagined promise of production control system, an entirely different thing by common understanding and admission."

Firms Tell Why They Said DP Jobs Difficult to Fill

NEW YORK — About 24% of the firms participating in a recent survey reported that DP jobs are among the most difficult to fill [CW, Nov. 21], but they didn't say why or what they are doing about it.

Now that information is available, according to Deutsch, Shea & Evans, the human resources consulting firm that conducted the survey.

Why are DP jobs hard to fill? The demand for programmers and systems analysts, like engineers and scientists, exceeds supply, for one thing. For another, qualified people are not available at the right price. Further, the turnover rate is high because DP skills are highly transferable to other companies.

How are companies tackling the problem?

About 72% of the survey sample answered this question. Fifty-four percent said they are increasing their recruiting efforts through more general recruiting (15%); college recruiting (11%); advertising (11%); other techniques (12%); and by increasing the geographic range of their recruiting efforts (5%).

Further, 20% reported internal efforts such as training, career development and upgrading existing employees. Seven percent said they are increasing salary offers, 3% reported lowering standards and 10% reported a variety of other approaches, such as redesigning jobs and paying relocation expenses, for example.

Split on Intervention

As for their opinions on various external measures such as federal government intervention, 50% of those surveyed answered that the federal government should take no action, and 23% felt it should.

Those that invited government action suggested tactics as tax credits and incentives for businesses. Others suggested the need for more government contracts as a means of building employment.

Regulatory agencies and regulations came under fire by the group, as did welfare and similar programs, the researchers said.

The questionnaire was mailed to 902 companies, and the first 201 responses (22%) were tabulated, the consulting firm said.

About 45% of the responses were from organizations with fewer than 1,000 employees, and 55% were from larger ones. Responses were from predominantly business and industrial organizations.

Calendar

Jan. 23-25, Washington, D.C. — **Course in Tape/Disk Librarian Functions**, sponsored by the U.S. Civil Service Commission Bureau of Training. Contact: Director, ADP Management Training Center, Bureau of Training, Attn: TOA, U.S. Civil Service Commission, 1900 E. St., N.W., Washington, D.C. 20415.

Jan. 23-27, Valparaiso, Chile — **Fifth Panel Discussion on Computation Topics**, sponsored by Chilean Association of Information Treatment. Contact: Aldo Migliaro, Director, Centro de Computacion, Universidad Catolica de Valparaiso, Casilla 4059, Valparaiso, Chile.

Jan. 30-Feb. 1, Washington, D.C. — **Data Processing Technology**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Jan. 30-Feb. 2, New York — **Forms Design Course**, sponsored by American Management Associations. Contact: American Management Association, The American Management Associations Building, 135 W. 50th St., New York, N.Y. 10020. Also being held March 27-30 in Chicago.

Jan. 31-Feb. 2, New Orleans — **IWP Spring Symposium**, sponsored by International Word Processing Association. Contact: Rudolph Lang, Prestige Expositions, Inc., P.O. Box 3084, Stamford, Conn. 06905.

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Regional Processing Centers Urged

Competition in Medicare Services Held Lacking

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Too little competition exists in the data processing services provided by the private sector for the federal government's Medicare program, according to a report recently delivered to the U.S. Health Care Financing Administration's (HCFA) Bureau of Medicare.

The firms that process bills and claims for the nation's elderly and disabled under Medicare now perform full facilities management for the government. More competition would result if the government owned and monitored regional processing centers and then let the private sector run them, the study performed for the bureau by Systems Architects, Inc. (SAI) concluded.

Before the government regionalizes its Medicare processing, however, it must first develop long-range DP policies, including planning, performance standards and management control procedures, the report said.

These policies should be designed to bring Medicare processing in line with a number of federal DP guidelines — including the stricture that services provided by the private sector must be competitive, the study added.

At present, two firms — The Blue Cross Association and Electronic Data Systems Federal, Inc. — dominate the contracting for Medicare DP, according to the report.

Regional Concept

Regional processing of Medicare claims or bills would involve decentralized data entry beneficiary services and provider — such as physician or pharmaceutical — services, according to SAI.

The concept calls for the federal government to "centralize Medicare DP using distributive processing techniques." Both the hardware and software involved at all sites would be owned by the government.

In order to regionalize, the government must assume and maintain overall management responsibility for the Medicare program's DP policy, SAI added.

Each regional processing center would be a site used by more than one of the organizations that have contracted with the government to process bills or claims under Medicare. Those intermediaries that process bills under the Health Insurance Program (Part A), which serves the aged, and carriers that handle the claims received under the Supplemental Medical Insurance Program (Part B), which aids the disabled, would be responsible for performing the DP functions associated with Medicare claims processing, the report suggested.

Pilot Program Urged

In its survey of current Medicare claims processing systems, SAI concluded that clerical and data entry functions should remain decentralized and that claims-processing operations should continue to be accomplished by the private sector.

A regional processing center experiment should be performed, but only after the weaknesses of standard reporting, hardware and software acquisition and DP policy that plague the present Medicare system have been resolved, the report said. The prototype center should be undertaken in particular to determine what cost savings could be gained from regionalizing Medicare processing and to test new management control standards and performance reporting policies.

Finally, SAI recommended the Medicare Bureau establish a task force to document requirements for combining Health Insurance Program and Supplemental Medical Insurance Program data into a single data base for DP purposes.

Called the Medicare Regional Processing Feasibility Study, the four-volume report cost the federal government $235,506 to produce.

In its quest to determine the feasibility and cost-effectiveness of consolidating Medicare workloads by using regional centers for claims and bill processing, SAI collected data on the way intermediaries and carriers currently process the nation's health benefit programs for the aged and disabled.

The contractor also studied the feasibility and economics of standardization and tried to come up with a model of Medicare run by regional processing centers.

The many reporting inconsistencies of the program made it impossible to quantify the actual requirements of a regional processing center, SAI said. The contractor could "only observe the qualitative differences between the various types of systems and methodologies used by various intermediaries/carriers.

"Data that would enable us to determine the cost to operate, maintain and enhance the various systems in operation today and extrapolate savings to a new regional processing center environment is not available," SAI added in its report. Consequently, it is extremely difficult to determine the savings that could result from regionalization.

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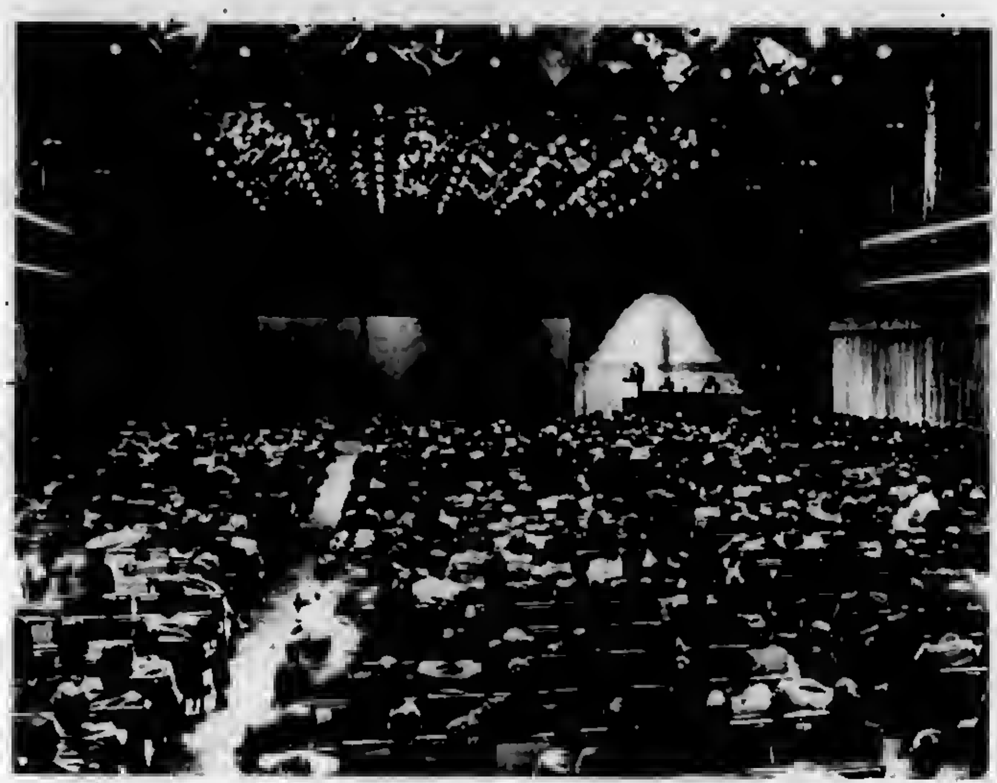

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System at GM 'Sees,' Inspects Ignition Chips

At the primary Sight-I installation, machine operator Toshiko Smith loads a supply tray for the inspection machine. The inspected and accepted output assemblies move in metal cassettes to the next production station.

By Catherine Arnst

CW Staff

KOKOMO, Ind. — A computer that can "see" is being used on the assembly line at General Motors (GM) to locate and inspect the integrated circuit chips used in the ignition systems of GM cars and trucks.

Sight-I, installed in January 1977, is said to be the first industrial vision system of its kind to go to work on a U.S. automotive production line. It was developed by Dr. Michael L. Baird of the computer science department of GM's Research Laboratories.

"I've developed a program that sharpens the sight of a computer so it can rapidly and reliably find nonoverlapping parts — even on visually confusing surfaces like conveyor belts which tend to camouflage the parts' outlines," Baird said.

The system is built around a Digital Equipment Corp. PDP-11/45 minicomputer with 16K memory and a solid-state diode array television camera. The image is picked up by the camera and converted to a mosaic of minute squares in varying shades of grey.

Within one second, the computer can fix the location of the chip by determining the coordinates of its four corners, for example. It can then inspect the chip for defective assembly characteristics, looking for such things as a chip that is tilted too much for automatic test equipment, off the edge of the heat sink or perhaps missing a corner.

Image Enhancement

The system processes about two chips per second in daily production, according to Baird. Before the Sight-I, GM used a human operator to visually determine the location of the chip, inspect for any defects and manipulate a set of electrical test probes over the base and emitter areas of the chip.

Using the digitized data from the camera, the computer is programmed to work through a sequence of image enhancement operations to silhouette the part and emphasize its outline.

The intensity of the squares along the edges of the object is intensified. Then the data is smoothed by erasing the false edges caused by irregularities in the background and by inserting more edges along the object boundaries.

Further operations ensure that the boundaries of all the objects are closed and that any holes inside the connected parts are filled. From the well-defined outline, the computer can calculate the position and orientation of the object on the conveyor belt, Baird said.

During the inspection process, the chip assembly itself is not moved; instead, an electrical test probe mechanism is rotated into the proper position, based on information received by the camera. A "relational template matching" approach is used for location determination and a contrast detection scheme performs the inspection task.

A set of computer programs then performs the vision task in five steps. First, the object is digitized to obtain a 50 by 50 image of the assembly. The program then determines the approximate location of the chip on the heat sink through gradient direction analysis. Possible corners of the chip in the image are located.

The computer then determines the actual four corners of the chip; finally, inspection for chip integrity is done by looking for uniform contrast around the chip edges.

The automated system has increased chip quality and throughput, Baird said. The time and costs required to develop a workable system were kept within the limits set in 1974, when the project was started, he added.

The Sight-I inspection system was developed cooperatively by the General Motors Research Laboratories, GM Manufacturing Development and GM's Delco Electronics Division here in Kokomo.

DP Helps Test Engineers In Concorde Certification

LONDON — The British Aircraft Corp. (BAC), builder of the Concorde supersonic transport, used a computer to bring the Concorde through its certification program and qualify it as airworthy.

According to a BAC spokesman, the system monitored more than 3,500 instruments that measured such variables as pressure, temperature and stress during test flights.

An ICL, Inc. 1904 analyzed data amounting to several million characters per test flight and converted it to actual measurements for use by test engineers, the spokesman explained.

The 1904 replaced an IBM 370-based system that used a GEC 9030 computer for ground replay and basic data analysis. The original system was set up to handle the comparatively low volume of flying planned for the Concorde.

However, it proved to be inadequate to bring the aircraft through the certification program on schedule, the spokesman explained.

The present system includes 128,000 words of core storage, 18 interchangeable 30M-character disks, two disk controllers, six 160,000- and two 60,000 char./sec magnetic tape drives, several printers, card and paper tape readers, two on-line graph plotters and three teletypewriter terminals.

The system usually processed six to eight jobs concurrently with programs varying in size from 5,000 to 100,000 words. The computer operates under the George III operating system, which provides control of both batch and online jobs with little operator intervention, the spokesman noted.

Two teletypewriter terminals are used on-line for program development and maintenance while a third maintains the aircraft's instrumentation schedule, he said.

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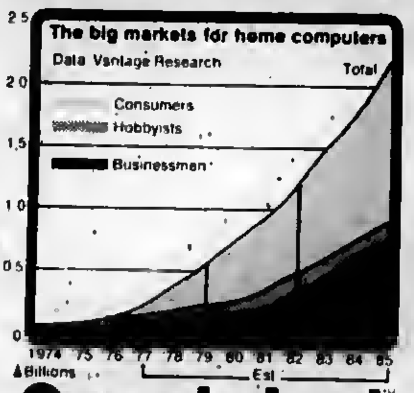

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Result in Hasty Decisions

Vendor Ploys Can Trap Users, Report Warns

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Vendors often trick users into buying more equipment than warranted and unknowingly committing themselves to future concessions.

Marketing personnel book a lot of business without having to negotiate contracts; they use "price protection" or "price increase coming" ploys that trick users into overbuying before the price rise hits, according to Issue 5 of the *Computer Negotiations Report* (CNReport).

Vendor representatives inform prospects that a price rise is coming and suggest that equipment needs for the next year or two be anticipated and the material ordered now, the report said.

The pitch can be strengthened by convincing users that this anticipatory approach ensures higher priority on the vendor's production and delivery schedules, the report said, adding that vendors can assuage user hesitancy by noting that the price-protective agreements can be cancelled at any time — or within 90 days.

Many users are convinced by this "price protection" ploy and buy a variety of superfluous items — most frequently peripherals, additional core memory and upgrade configurations — and some even contract for an entire new system, *CNReport* continued.

"The user frequently signs the price protection contract without any serious negotiations over price or terms. In most cases, the user simply signs the vendor's standard form agreement, without additions or deletions. Needless to say, the user leaves important legal, financial and substantive concessions lying on the table," the report said.

For example, it said, the user often ends up with a high-cost rental agreement when a third-party lease is preferable.

Incomplete Review

The contract often is not properly reviewed by user senior management, with disastrous results if the transaction "blows up" or is learned about indirectly by a board member at a later date, the report indicated.

Cancelling the contract may be much more difficult than implementing it, the report warned, adding that the contract may not even mention cancellation or require the vendor to permit it.

Moreover, "if the user decides to change vendors or take other action against the incumbent vendor, the latter may resurrect the price protection contract and threaten to enforce it."

The price protection gambit is generally used when user and vendor are not negotiating on some other transaction. The related "price increase coming" ploy is often used when negotiations are in progress, according to the report.

This entails rushing the user into overbuying while effectively ignoring considerations other than the impending price hike. Typically, a vendor marketing representative tells the user the hike can be avoided if the contract is signed by a certain imminent date; in a panic, the user signs without pursuing other points of greater value.

CNReport recommends that users follow two rules in resisting these ploys: "never sign a 'price protection contract' without full review, approval and negotiations" and "do not be rushed into acquiring ... when the vendor seems to be dangling a carrot."

Trade Bank System Lets Members Barter for Products and Services

By Tim Scannell
CW Staff

SCOTTSDALE, Ariz. — An idea born 12 years ago when L. David Fox decided to trade draperies for needed dental work has evolved into an association of more than 300 business members with transactions totaling upwards of $1 million annually.

Fox created a computerized trade bank whose members can barter among themselves for products and services without having to exchange money. Members of the National Businessman's Association, Inc. (NBA) are issued their own trade credit checking accounts, which include check blanks and deposit slips, and are then given an account number, Fox said.

After that, transactions are carried out among members, through the NBA. The system's operation is not unlike that of an ordinary bank except for the absence of money, he explained.

The basic principle of the NBA, that of conserving money, was one of the main reasons for its initial acceptance and growth, Fox noted.

"A lot of people like to trade and anytime a merchant can trade what he has for what he wants, it conserves his cash. It seems that most people today are long on products but short on money. If they take their product or service and use that as their medium of exchange then they don't have to have money, really," he explained.

Transactions in what he calls the "NBA barter-bank" are accomplished this way, he said. "Member A goes to Member B and, let's say, buys a set of tires from him. Well, he pays him whatever his retail price is but he writes him a trade credit check for it.

"Member B then fills out a deposit slip ... mails it in for deposit (to the NBA) and the computer credits Member B's account and debits Member A's. Member B then has these trade credits in his account that he can then spend with any of the other members in the entire association," Fox stated.

Currently, the NBA contracts for computer services from a local business that also happens to be a member of the association, Fox said. Its installation uses a Prime Computer, Inc. 300 system with 64K of memory and a 12M-word storage capacity, a spokesman for the firm said.

As with any business or venture, the Internal Revenue Service (IRS) must be notified about income of any sort, a representative of the IRS said. "As a general rule, in instances where no money changes hands or there is only a partial exchange of money, the measure is the fair market value of what you receive over what you give up," any excess being taxable income, she explained.

The NBA does not accept the responsibility of reporting a member's income to the IRS, Fox said. It does send each member a monthly statement which includes such information as from whom he purchased, the date, check number, firm name and amount of purchase as well as

(Continued on Page 12)

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Creates Too Much Waste

MIS Called 'Disease' of Centralized Systems

By Esther Surden
CW Staff

ANAHEIM, Calif. — Centralized systems suffer from management information systems (MIS), a "management disease" whose symptoms are voluminous planning reports, much wasted management time, millions of dollars down the drain and eventual disillusionment of users, according to Jacob Sternberg, president of Conversational Systems Corp.

Speaking about distributed processing at a recent conference here, Sternberg continued to say that most centralized DP departments as they stand today cannot implement local systems well.

The DP establishment "no matter how competent," is removed from the business structure of the company. In contrast, the distributed structure satisfies local needs, he said.

Local systems are often designed by a Ph.D. sitting in an office far removed from the local operation who learned applications from a book and then generated those applications centrally.

Or else, the local unit requests certain reports from the central department. The central DP area then requests the user to prepare a detailed functions specification, which Sternberg described as a contract between the user and the implementer.

The DP department needs this because every new system put on the large CPU must be checked for its impact on every other procedure and application on the system.

The result of all this checking, however, is a large backlog, long delays for the user and high costs, he said.

Further, the packages that result from this procedure are often generalized to accommodate all eventualities. Generalized packages can be equated to homogenized milk, Sternberg asserted; "you don't get the cream." The packages cannot account for local diverse needs.

With local implementation of systems, however, planning can be simplified, he said. Applications only have local impact, so users can "try and fail and not affect the business."

The remote areas do need some central coordination, he acknowledged. Standards for the transmission of data to the central site, for example, could be developed by the central site, he said.

The other function of the central site is to monitor adherence to its standards. Standards provide uniformity across all systems, eliminate a lot of documentation, and make unnecessary a lot of the meetings between designers and users that now take place.

Distributed systems could be implemented more easily through use of what Sternberg called plug-to-plug compatible software. Comparing software used in distributed systems to plug-compatible peripherals, he noted that the peripherals had two requirements — they had to adhere to a standard and they had to be pluggable without modification. So software that adheres to the standards set by the user can be plugged in and out of a software system to develop applications in a building block manner, he explained.

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Storage Media Sold Via Direct Mail

By Joseph V. Popolo
Special to CW

The advent of the low-cost computer has left the minicomputer manufacturer faced with the problem of servicing what is dubbed the "after market."

Servicing implies two roles — equipment repair and providing supplies and media. The first role has been well addressed but up to a year ago, manufacturers chose not to become suppliers of media and consumables. With customers investing $100,000 and up in hardware and software, media dollars seemed insignificant.

But the installation of small computers has increased as system prices have decreased and the supply market has changed accordingly.

A survey of mini users conducted by *Modern Data* earlier this year determined the typical user spent $500 to $1,500 on all his consumable supplies and media each year. Because of this low figure, using the salesman who sells the hardware to sell the follow-up products is not economical.

Many manufacturers simply marked up products four or five times their normal market price to discourage sales without appearing to indicate they weren't supporting their customers.

One of the few manufacturers attempting to meet changing customer needs is Digital Equipment Corp.

With an estimated 50% of the installed U.S. minicomputer base, DEC has a captive built-in starting market for its media products. Instead of leaving the market to business and office supply companies, DEC decided to reach users through the direct mail approach.

Having a single source for products such as disk cartridges, floppy disks, cassettes, binders, ribbon and paper is a definite plus for the user. The customer can expect to be adequately serviced by a direct mail firm which can provide the variety of products he needs and at the same time give him quick delivery.

DEC apparently believes in the success of its new distribution method since it has already put out two additional catalogs.

There are several regional firms, one on the West Coast and another in Connecticut, using the direct mail approach for mini users. There are other firms selling nationwide, but only to large computer users.

But the users will be exposed to some hazards in the direct mail approach. This is especially true with magnetic media products. Many manufacturers place their own labels on magnetic tape, cassettes and flexible disks even though they come from a variety of sources.

This is not the only area the user will have to guard against. Hassling with a direct mail firm, be it erroneous billing or a leaderless cassette from a guaranteed compatible Brand "X" supplier, the user will face some headaches. It is probably best to stick with name brand products, pay the differential and save lots of problems. The relative differential between a $16 top-of-the-line name brand magnetic tape and a $10.95 special is worth a lot more in potential loss of data records.

Popolo is president of Misco, Inc., a minicomputer supplies company.

CDP Exam Course Set

PHILADELPHIA — A refresher course for candidates planning to take this year's examination for the Certificate in Data Processing (CDP) will be offered here on six consecutive Saturdays.

Sponsored by the Data Processing Management Association (DPMA) chapter here, classes will be held each Saturday from Jan. 7 until Feb. 11.

The fee is $50 for members of any DPMA chapter or other organization in the Institute for the Certification of Computer Professionals. Nonmembers will be charged $50.

Applications should be returned by Dec. 31 to William R.Patterson, CDP Refresher Course, Philadelphia Chapter, DPMA, P.O. Box 2177, Philadelphia, Pa. 19103.

System Bypasses Cash

(Continued from Page 11)

what, if anything, was purchased from him.

The NBA, having recently celebrated its second anniversary, is still very young, Fox noted. Its membership includes doctors, dentists, attorneys, certified public accountants, restauranteurs, clothing and toy merchants and contractors. There is even a veterinarian and a vasectomy center included in the association "... so you can get your cat spayed or your husband fixed," Fox said.

The NBA also offers such group benefits as legal counseling, group insurance, seminars, a directory and a monthly newsletter, Fox claimed.

Besides promoting a sort of camaraderie among its members, the NBA also stimulates business, Fox noted. If a member wants to buy a suit of clothes, he will more than likely do business with a fellow member even if that means traveling across town to do it, he said.

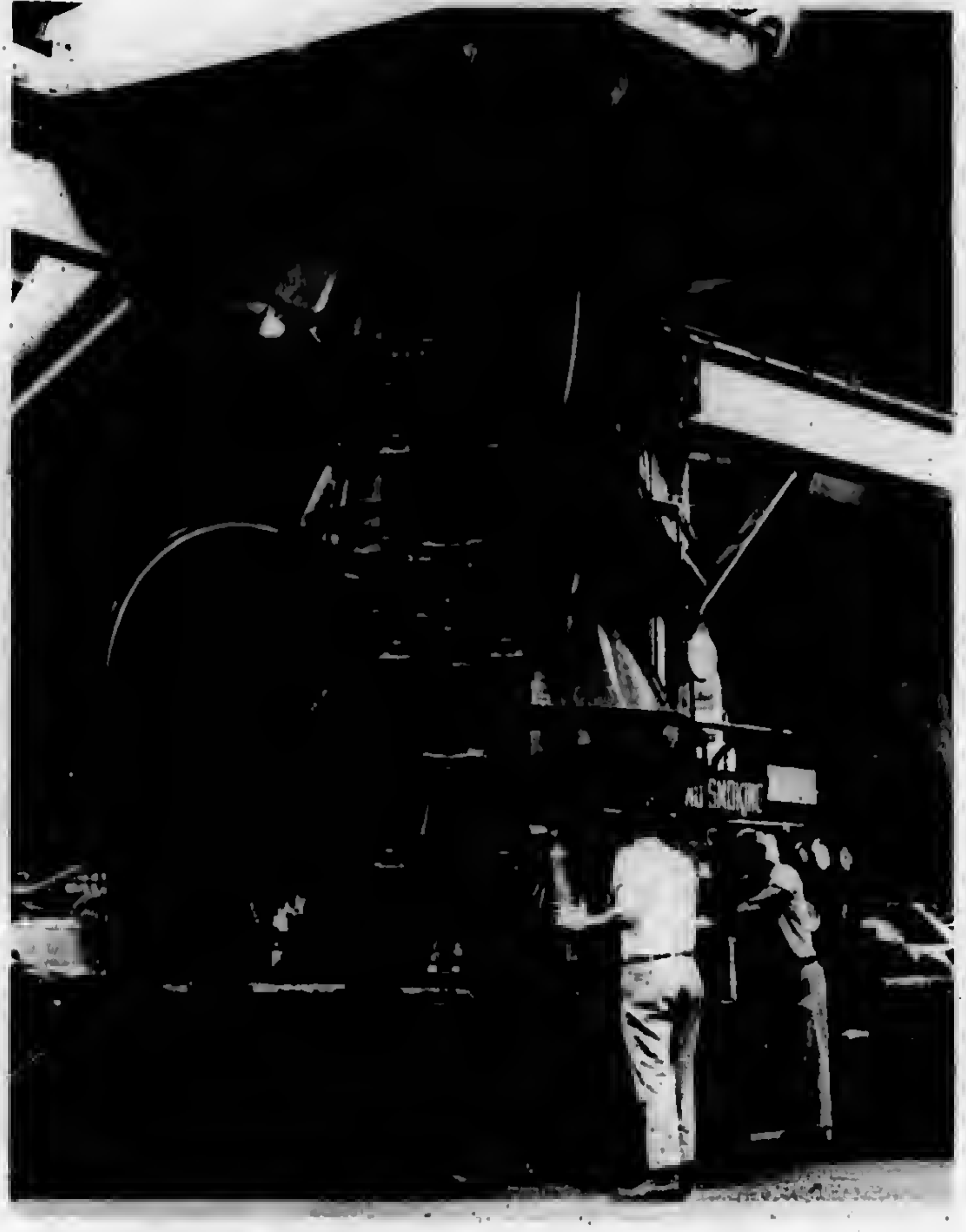
Membership in the NBA costs $136 with the member receiving $100 in trade credits. Semiannual dues are then $36 and the NBA makes a 10% service charge on transactions — 3% on the trade credit portion and 7% on the cash portion, Fox continued.

Fox hopes to establish NBA branches in Dallas, Houston, Oklahoma City, Denver and Salt Lake City, he said.

Advertisement

DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals



Libbey-Owens-Ford Manages Rapid Changes with DL/1

"Our product now is technically more sophisticated and highly individualized, requiring many more stages of production. The part number count has zoomed from 400 to 8,000 and we're adding 200 new items a year."

The product is automotive glass. The speaker is Robert Whittington, executive director of management information systems for Libbey-Owens-Ford. He is describing why LOF turned to Data Language/I (DL/1) for data base management on its IBM System/370 Model 158 at Toledo, Ohio. To control a network of IBM 3277 Display Stations, which handle online transactions from the factory floor and throughout the plant, LOF uses the Customer Information Control System/Virtual Storage (CICS/VS).

"We're constantly called upon for more variations of the product," Whittington notes, "such as embedded antennas or defrosting elements, tinted glass, edge bands and etched designs. In addition, production and delivery must be precise because our customers don't carry inventory. We ship directly to their assembly plants and must accept order changes up to the last minute.

"All this means constant rework of our Production Information System," Whittington adds. "Before we had DL/1, a little thing like changing from seven- to eight-digit part numbers would require extensive reprogramming. Because DL/I protects the program from any changes in data structure, we have complete device and data independence. Now we can direct the computer to track an entire new sequence of production stages simply by making an entry in our DL/1 data base. And the creation of data entry editing routines to catch errors is simplified.

"Through inquiry into the DL/1 data base, management and production control people can obtain a better picture of what's happening on the plant floor. The scheduling department can spot potential trouble before production is seriously affected and we consistently achieve better schedule compliance. Now we handle increased product complexity and volume without adding people to the scheduling department.

"We can readily apply the data base developed under DL/1 to such management functions as budgeting, cost control, and financial planning. But most important, we do more than cope with changes. We're able to manage them."

This heat-treating machine, called an autoclave, bonds auto windshield laminations. DL/1 helps Libbey-Owens-Ford control production to meet demand for a fast-growing list of part numbers.

TWA Computes $24 Million Yearly Fuel Saving

An IBM computer is helping Trans World Airlines conserve more than 70 million gallons of precious fuel a year. At current prices this means a yearly saving of $24 million. Key to achieving this are an online flight planning system and a preferential fueling program.

With online flight planning, information on aircraft performance and routes is stored in the computer. The system analyzes payload, fuel requirements, allowable takeoff weight, flight time, weather and up to five different altitudes. The system then displays fuel consumption, flight time and operating cost for every possible route/altitude combination. The system also determines power settings for climb, cruise and descent.

A dispatcher reviews the alternatives and recommends the optimum least-cost route and altitude to the flight captain. The flight plan can be revised at the last minute should the weather or other conditions change.

"Manually calculating the best flight plan once took hours," says Roger R. Fischer, staff vice president, application development and maintenance for Trans World Airlines. "Our System/370 Model 168, located in Kansas City, Missouri, does it in seconds, with accuracy unobtainable any other way. And we plot over 1,500 flight plans a day for Trans World Airlines' worldwide operations."

An IBM computer, which plots over 1,500 flight plans a day, helps Trans World Airlines conserve more than 70 million gallons of fuel yearly.

Preferential fueling helps TWA allow for wide variations in fuel costs at different points. The program helps TWA find the least-cost location to take on fuel along the route. Even though it takes fuel to carry fuel, the computer will show if it pays to carry enough to avoid refueling at stops where costs are high.

"We've adopted other economy measures, such as flying at higher altitudes, flying slightly slower and taxiing on fewer engines," Fischer points out. "But the computer has been a big factor in our economy drive. With fuel bills running over $380 million a year, both the dollars and the precious fuel saved have been vital to us."

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Editorial

Too Late Now

Having watched its highly promoted Consumer Communications Reform Act become caught in the gears of congressional machinery, the telephone industry has opened its second front.

This latest offensive comes from an industry task force that diligently formulated four proposals [CW, Dec. 12] that would uproot basic network configurations and undoubtedly raise costs to these users.

It is ironic that consumers were hard-pressed to identify with the noncompetitive concepts of the earlier "Consumer" Act, but are not directly affected by an industry proposal that makes no mention of them.

By recommending an industry structure that would eliminate private line service competition, that would do away with foreign exchange (FX) lines and that would eliminate Common Control Switching Arrangements (CCSA), AT&T and its allies have hit the user right in his wallet.

As one source stated, the data user has benefited directly from the churning caused by competitive services and equipment. The industry task force would cut off any real competition for all but point-to-point and tandem tie line facilities.

According to one interpretation, the latest framework would require any competitors that could manage to carve out a permissable niche to price their services under fully allocated (high) costs. At the same time, the existing phone companies would provide similar service under incremental (low) cost principals. The net effect would be the death of the competing carriers.

The proposal would also do away with the value-added carrriers, such as Telenet, which provide network services specifically for data users. Although members of the task force have said they do not intend to wipe out the value-added carriers, no amendment to the original four-point proposal has been made.

In fact, it appears the announcement of the task force proposal was carefully controlled so that pro-carrier segments of the trade press would first have their chance to present it in the most favorable light.

Despite the repeated assurances from AT&T Chairman John deButts that AT&T and its partners really want to get along with the competing carriers, there is little compromise in the latest proposal.

Perhaps AT&T should have looked at the record before it convened a puppet task force to turn back the clock. FX, CCSA and private line services were the brainchild of the existing carriers. But now that revenue is being impacted by the specialized carriers, it apparently feels it is time to shut off these services for everyone — including the user.

The Federal Communications Commission has rejected all the anticompetitive arguments; the cuurts all the way up to the Supreme Court have turned a deaf ear. There is little question that users will raise an outcry against the anticompetitive attempts.

The truth is that the telephone company is not willing to share the user's dollars with anyone.

It is time the telephone company paid a little more attention to providing better services to users and forgot this continuing futile attempt. Nobody is listening anymore; it is too late.

Data Past

Five Years Ago
Dec. 27, 1972-Jan. 3, 1973

NEW YORK — An internal IBM memo was uncovered that said an "intensive investigation" of IBM's pricing policies "would reveal the extent of price control and its supporting practices" in the computer market. "Such a revelation would not be helpful to IBM's monopoly defense," the memo stated. The document was one of 27 million filed in the various antitrust cases against the company.

— — —

BOSTON — The Massachusetts Privacy and Security Council was formed to oversee privacy considerations in police information systems. The council, made up of lawyers and "interested citizens" rather than users of computer-based criminal justice systems, was to consider whether the state's police agencies should tie into the FBI's Computerized Criminal History system.

Eight Years Ago
Dec. 31, 1969-Jan. 7, 1970

NEW YORK — The shakeout of the time-sharing business continued as ITT Data Services closed its computer facilities in Princeton, N.J., and at Broad St. in New York.

— — —

WASHINGTON, D.C. — Rep. Jackson E. Betts of Ohio warned that "individual dossiers on 33 million Americans would be prepared and housed in federal computers" if two proposed data banks were approved by Congress. The data banks were to be "integral but little-noticed parts of the Family Assistance Act of 1969 and the Manpower Training Act of 1969, in formative stages of consideration by House and Senate committees," according to Betts, who charged "there is no provision in either bill to protect the privacy of citizens whose personal histories will be in the dossier centers."

'Sorry We Can't Negotiate a Settlement of the Antitrust Suit — All Our People Are Tied Up Prosecuting It.'

Letters to the Editor

Multiple Encryption

Even if Martin Hellman's contentions concerning the Data Encryption Standard (DES) are correct and the National Bureau of Standards' contentions concerning the impossibility of building Hellman's brute force code-breaking machine are incorrect ["Federal Encryption System Hit as Vulnerable," CW, Dec. 5], the very existence of an inexpensive device with the capability of the DES part would appear to me to offer a simple method of generating unbreakable code. At the prices quoted in the article, anyone who can afford encryption equipment can afford to use multiple encryption.

My Hewlett-Packard HP-21 calculator supports Hellman's statement that his hypothetical deciphering machine could try each of the 2^{56} possible key combinations in just under 21 hours of continuous operation.

However, if the data to be encrypted were run through two successive DES devices, each using a different code key string, then the number of possible combinations rises to 2^{112}, and the same hypothetical machine would require a continuous run of 1.645 X 10^{14} years to try all of the possible code key lists.

By carrying this idea through four more steps, (or running the data through six successive DES devices), the number of possible key combinations grows to something in excess of the range of my calculator — i.e., more than 9.99 X 10^{99} possible codes.

In addition, this method would probably negate the effects of any "rigging" of the basic algorithm by the National Security Agency.

I read *The Code Breakers* several years ago and no longer have a copy, but I seem to remember that the only system rated as completely secure by the experts is multiple machine encryption with frequent (daily, for example) code key changes. The availability of an inexpensive DES-based part would seem to make this an easily achievable goal.

C.J. Morrell
Steilacoom, Wash.

Educators, Not Hucksters

I have difficulty accepting the guilt by association proffered by Mort Burdman ["End the Effluvium," CW, Nov. 14] and other CW letter writers.

Certainly there are those in this field who aim to profit financially by beating the drum of licensing/-certification, etc., but I take exception to the view that those of us who run courses for candidates for the Certificate in Data Processing (CDP) are "hucksters."

I am coordinating an effort by the Philadelphia Chapter of the Data Processing Management Association (DPMA) to sponsor a refresher course for candidates for the CDP. I expect to teach for no more than one-sixth of the 36-hour course and will receive no more than the standard classroom-hour rate we pay all our instructors. If there is a profit in this course, it wlll revert to the chapter, not to me, to be used for professional programs.

I wish to disassociate our course from those who would drum up controversy for their own personal financial profit (Ken Lord runs a company that provides practice exams, etc.) but I also wish it not to be attacked by those who care to remain ignorant.

William R. Patterson
DPMA
Philadelphia, Pa.

Visit to ProgaMan

How Well Will Robot Programmers Do?

By Jack Stone
Special to CW

Unimate, Versatran, Millcron, Prab ... these are the newest trade names to be added to the ever-growing roster of computer-based products. If they seem unfamiliar to you, it's because they refer to a class of very special-purpose machines called "industrial robots."

Jerry Knight of the *Woshington Post* recently wrote an interesting article about these devices. In answer to the question "What is a robot?", he quoted Joseph Engelberger, first president of the Robot Institute of America, as saying, "I don't know how to define a robot but I know one when I see one."

He further noted AMF, Inc.'s claim that its "Versatran Series F — the world's strongest robot — could easily pass for an oversized, deformed drill press, dragging its hydraulic heart and an electronic brain behind it." He went on to say that a Unimation spokesman defined robots as "self-contained, computer-directed machines with memories capable of performing human functions."

To program the machine, "a skilled operator directs it through the desired task, manually moving the robot's arm and hand through the motion while feedback devices record every motion in the robot's computer brain. Flip a switch from 'teach' to 'run' and the robot repeats precisely the movement it has been shown...."

... My friend Lamia Shaitan phoned me late one evening last week. She is a programmer/analyst and amateur inventor. I place here in the "amateur" category because she has yet to succeed in bringing a product to market.

"Hey, man!" she ranted. "Hurry on down here. I've got it! I've finally hit it! I have developed THE answer to the programmer productivity problem.

"None of that targeted 10% improvement stuff from structured this-and-that. I've got the real McCoy — total performance at all times! And no worries for the DP manager about bruised egos, weird working hours and acid rock Musak. It's all resolved!"

I sensed a potential follow-up for my column dealing with automation in the computer center [CW, Oct. 31] but was taken aback by lurid streaks of lightning running through overcast skies as I drove to her Georgetown mansion. I also noticed what seemed to be a tall, outside antenna though I had no memory of Lammy being a ham radio freak.

She ushered me into the garret. "Voila!" she preened, pointing to a metal table on which there was an object about eight feet long and two feet wide. "Let me demonstrate PrograMan!"

I was startled as she opened the skylight, pushed me against a wall and threw a knife switch. A flash of light swept across the room, accompanied by a sharp boom. She twisted the knob on a small black box, waited for a green light to show, then twisted the knob again.

The Human Connection

I noted that the knob was set to "RUN: Cobol Coder; Start 9 a.m."

The cloth rippled. Two claw-like hands came out from under the covering and began to fold it back. What appeared to be some kind of synthetic human (bearing a faint resemblance to some people I've met) sat up, made a yawning movement and then scratched its backside.

The head was squarish and was wearing a dark brown hairpiece and a long, scraggly beard. It was dressed in a drooping tan sweater, faded baggy blue jeans and wornout sneakers. There was a jagged scar on its forehead and two shiny steel knobs protruded from either side of the neck.

PMan appeared awkward as it struggled to its feet and rambled over to a desk. It opened a Cobol reference manual, pulled out flowchart and coding pads, sharpened a pencil, posted a sign saying "out for coffee — back in 5 min." and sauntered into the kitchen.

It returned about a half hour later, picked up the telephone, dialed a number and yelled, "Wake up, you guys down there! Where the blazes is my output? Don't you ever do anything right?"

Then PMan picked up a notebook titled "Systems Feasibility Study" and began to read it. I'm certain I heard it mutter, "I can't believe it! Another crazy user! This one wants the company's New Year's party fund accounting on-line!"

It then looked at its wrist as if checking the time and remarked, "Geez! 11 o'clock already. Better leave for lunch now to get ahead of the crowd. Maybe I'll do some New Year's shopping afterwards." It then started for the door.

Lammy quickly turned the switch to "SKIP 5 HOURS, THEN RUN." PrograMan turned around, set down some make-believe packages, stepped over to the desk, grabbed a pencil, coded 11 MOVE statements during the next minute, and exclaimed, "Yessirree! Ten lines a day keeps the big boss away!"

HAPPY NEW YEAR!!

Unsubstantiated Output

Saks Billing System May Violate ICCP Code

The Taylor Report

By Alan Taylor CDP

A reader, Gerald Clarke, recently forwarded to me a balance statement he received from Saks Fifth Avenue. It contains an error that leads me to question the validity of the systems design of Saks' billing procedure.

Saks Fifth Avenue has a group of computer-flagged accounts called H3s. These are accounts that do not have the true account balance within the computer system at all. They arise particularly when merchandise is returned and credited, but the account then remains inactive. Under these circumstances, the credit is placed in some archives outside the system, and the computer flag, together with the minimum of information about the account holder, are all that is maintained within the system.

These accounts undergo no further activity (except for name and address changes) until some transactions reactivates them. Then out comes a bill like the one illustrated. This shows the new activity, prepares a balance line and prints everything. However, mailing is not automatic; the H3 stops it and instead the bill is sent to research. In the case of Gerald Clarke, it was subsequently mailed to him, unaltered.

Sending the item to research, however, does not stop further processing. Statements come out, claiming that the person concerned owes all the current transactions but failing to give him credit for the true balance of his account still in the archives.

All of this brings us firmly up against the Institute for the Certification of Computer Professionals' (ICCP) Code of Conduct for holders of the Certificate in Data Processing (CDP). Saks insisted to me that what happened to Clarke does not indicate that there is anything wrong with its computer system design, but I think it does.

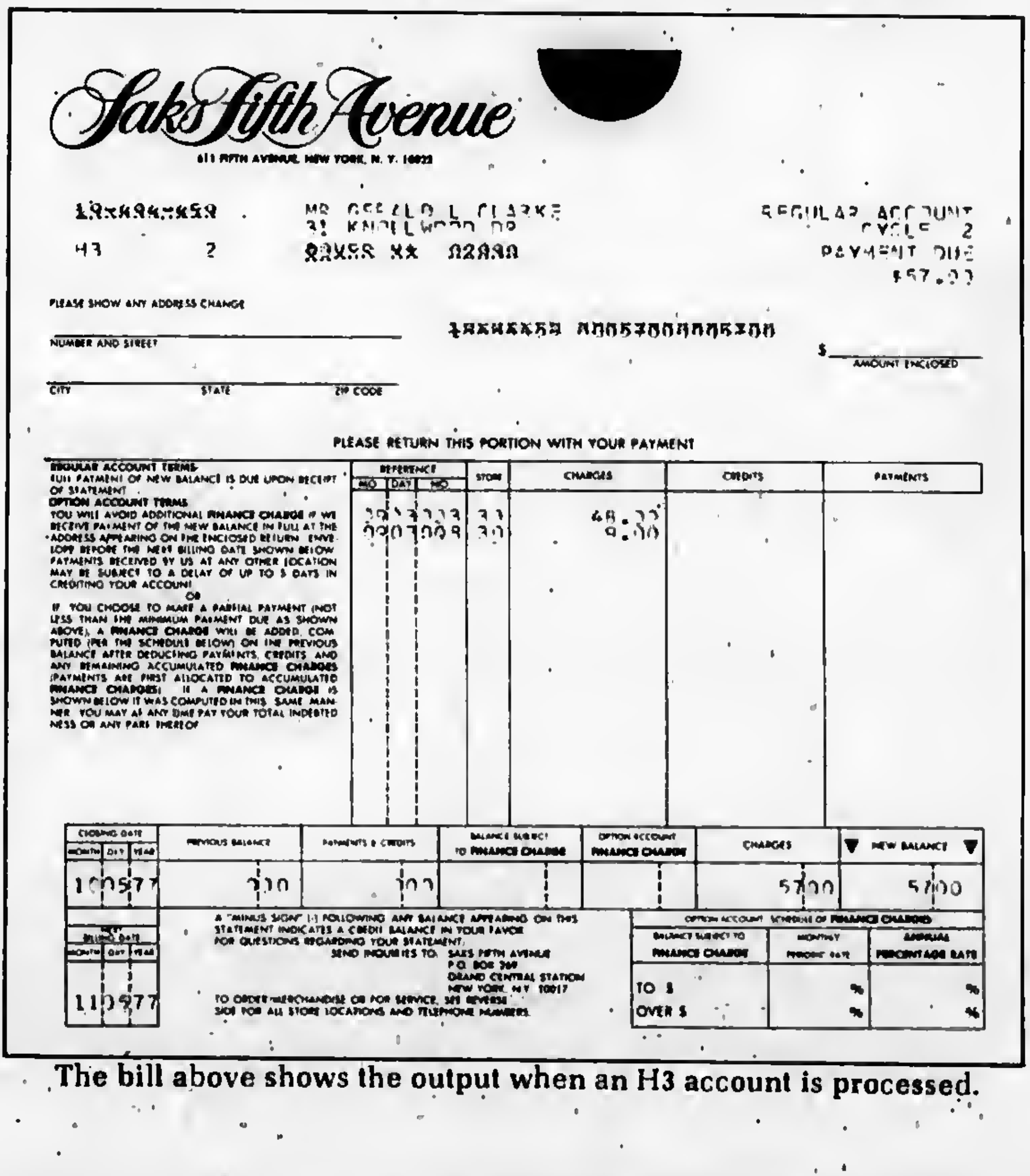
ICCP Code

The ICCP code, which applies to people who have been certified for systems design as well as for other specific subjects, requires that a CDP holder give a "conclusion on a subject in his field only when it can be demonstrated that it has been founded on adequate knowledge." Now, I know of no more formal statement of a "conclusion" than the systems design itself. Therefore, I regard ony entry on the printed output that cannot "be demonstrated [to have] been founded on adequate knowledge" as a direct infringement of ICCP 2.2.

Now, looking again at the bill Saks put out, the key entry that no one even claims is "founded on adequate knowledge" is the fictitious entry "Previous Balance .:$0.00."

The H3 system flag — printed above top left — indicates that the "previous balance" was some undesignated amount owed to Clarke.

(Continued on Page 16)



Saks Fifth Avenue
611 FIFTH AVENUE, NEW YORK, N. Y. 10022

[illegible] MR GERALD L CLARKE REGULAR ACCOUNT
31 KNOLLWOOD DR CYCLE 2
H3 2 [illegible] PAYMENT DUE
$57.00

PLEASE SHOW ANY ADDRESS CHANGE

NUMBER AND STREET

CITY STATE ZIP CODE

[illegible]

$ AMOUNT ENCLOSED

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT

REGULAR ACCOUNT TERMS
FULL PAYMENT OF NEW BALANCE IS DUE UPON RECEIPT OF STATEMENT
OPTION ACCOUNT TERMS
YOU WILL AVOID ADDITIONAL FINANCE CHARGE IF WE RECEIVE PAYMENT OF THE NEW BALANCE IN FULL AT THE ADDRESS APPEARING ON THE ENCLOSED RETURN ENVELOPE BEFORE THE NEXT BILLING DATE SHOWN BELOW. PAYMENTS RECEIVED BY US AT ANY OTHER LOCATION MAY BE SUBJECT TO A DELAY OF UP TO 5 DAYS IN CREDITING YOUR ACCOUNT
OR
IF YOU CHOOSE TO MAKE A PARTIAL PAYMENT (NOT LESS THAN THE MINIMUM PAYMENT DUE AS SHOWN ABOVE), A FINANCE CHARGE WILL BE ADDED, COMPUTED (PER THE SCHEDULE BELOW) ON THE PREVIOUS BALANCE AFTER DEDUCTING PAYMENTS, CREDITS AND ANY REMAINING ACCUMULATED FINANCE CHARGES (PAYMENTS ARE FIRST ALLOCATED TO ACCUMULATED FINANCE CHARGES). IF A FINANCE CHARGE IS SHOWN BELOW IT WAS COMPUTED IN THIS SAME MANNER. YOU MAY AT ANY TIME PAY YOUR TOTAL INDEBTEDNESS OR ANY PART THEREOF

REFERENCE MO	DAY	NO	STORE	CHARGES	CREDITS	PAYMENTS
[illegible]			[illegible]	48.00		
[illegible]			30	9.00		

CLOSING DATE MONTH DAY YEAR	PREVIOUS BALANCE	PAYMENTS & CREDITS	BALANCE SUBJECT TO FINANCE CHARGE	OPTION ACCOUNT FINANCE CHARGE	CHARGES	▼ NEW BALANCE ▼
100577	000	000			5700	5700

NEXT BILLING DATE MONTH DAY YEAR
110977

A "MINUS SIGN" (-) FOLLOWING ANY BALANCE APPEARING ON THIS STATEMENT INDICATES A CREDIT BALANCE IN YOUR FAVOR
FOR QUESTIONS REGARDING YOUR STATEMENT,
SEND INQUIRIES TO: SAKS FIFTH AVENUE
P.O. BOX 369
GRAND CENTRAL STATION
NEW YORK, N.Y. 10017
TO ORDER MERCHANDISE OR FOR SERVICE, SEE REVERSE SIDE FOR ALL STORE LOCATIONS AND TELEPHONE NUMBERS.

OPTION ACCOUNT SCHEDULE OF FINANCE CHARGES

BALANCE SUBJECT TO FINANCE CHARGE	MONTHLY PERIODIC RATE	ANNUAL PERCENTAGE RATE
TO $	%	%
OVER $	%	%

The bill above shows the output when an H3 account is processed.

Saks Procedure OK?

1. The Saks System creates a fictitious "prior balance." Is it correct to do this

(a) At all? ☐ Yes ☐ No

(b) For internal purposes to help research? ☐ Yes ☐ No

(c) For outside distribution? ☐ Yes ☐ No

(d) For carrying forward to the next statement? ☐ Yes ☐ No

Comments ____________________

2. Taylor equates a system's authorized output with the system designer's formal conclusions and says they are, therefore, subject to professional codes.

Do you agree? ☐ Yes ☐ Only Partly ☐ No

Comments ____________________

3. Does your professional society, or professional certification, have any codes equivalent to ICCP 2.2?

☐ Yes ☐ No ☐ Don't Know

Organizations concerned ____________________

Name ____________________

Professional Position ____________________

Street Address ____________________

Town/State/Zip ____________________

Please return the completed form to Atan Taylor, c/o Computerworld, 797 Washington St., Newton, Mass. 02160. Thank you.

System Violates Code of Conduct

(Continued from Poge 15)

So, the $0.00 entry, created probably by an initialization routine, not only fails the test of "being able to be demonstrated [to] have been founded on adequate knowledge" but is also directly contra-indicated by the information in the record.

The correct entry in such a case would have been "unknown." This should have been printed in both the "Previous Balance" and "New Balance" fields at the bottom of the invoice and also in the top right-hand entry under "Regular Account Cycle 2." Certainly there is no adequate knowledge that a $57.00 payment is 'Due' — because that springs from the grossly wrong assertion the prior balance was zero.

Now I don't know if the systems design was ever signed off by a CDP, in the way that a set of architectural blueprints are signed off by a certified architect. I don't even know if it was signed off by a member of any of the other professional societies who have adopted similar codes of conduct. I don't know if it was signed off at all or whether Saks should be questioned about why it was running a system without professional sign-off, if in fact it was.

All these things are important in themselves but at the moment I simply want to stress that Saks created computer output both on a bill and on a statement where there simply was no "adequate knowledge" that could support it. I think it's wrong, Saks thinks it's OK; now it's your turn to speak. I look forward to your responses by letter or by answering the questionnaire

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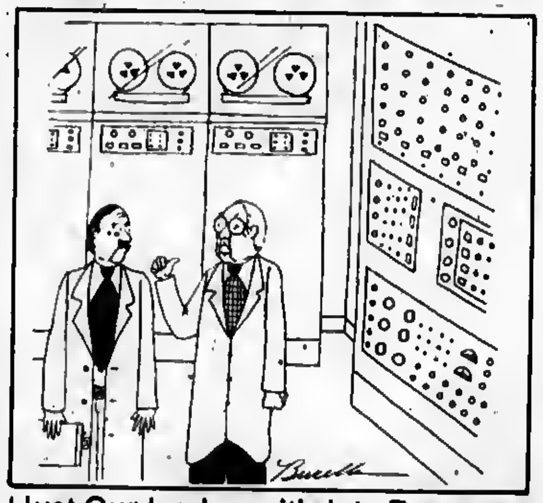

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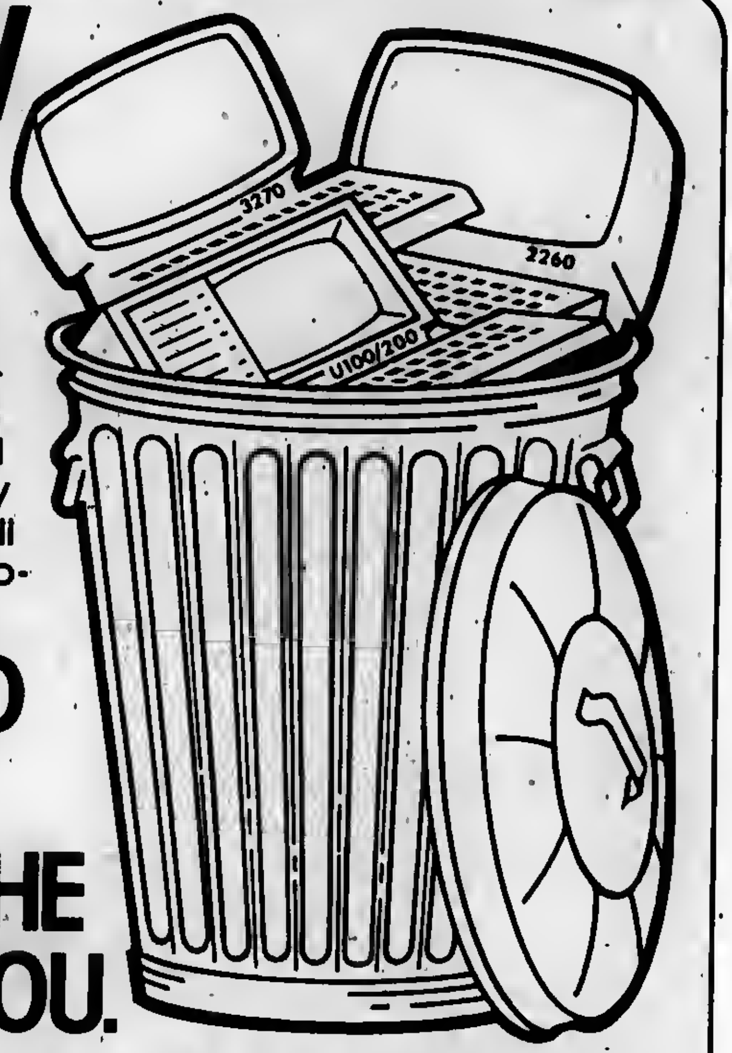
We realize your first impulse will be drastic when you see our 700/UETS (Universal Emulating Terminal System) in action—but remember that other less demanding terminal users may have an application for your outdated machines. And why should you have so many different terminals when ONE UETS can do all the work—and do it better and more economically.



IF PARTING WITH OLD FRIENDS IS PAINFUL, JUST THINK WHAT THE UETS WILL DO FOR YOU.

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In Software/Services World

Past Year Interesting But Not Dramatic

By Don Leavitt
CW Staff

Sometimes specific events give shape to a year; sometimes they don't. In the world of software and services, 1977 seems to have been one of the shapeless years.

That sounds far more negative than it should. The year was an interesting one, even if it didn't see any truly dramatic product announcements or widespread battles of users vs. vendors.

The "maturing of the marketplace" often seems like an overused phrase, but it was appropriate for the 1977 software/-services scene.

That showed up early in the year in connection with *Computerworld's* special report on application packages. In past years CW received numerous articles describing, quite usefully, the detailed scoring system a user employed to evaluate various packages.

In '77, however, the stories focused on concerns (sometimes problems, but often just "the best way to...") that came into play after the package was selected.

User Selectivity

Other sources indicated a similar situation. Packages were apparently accepted as a logical way to get work up and running, but as a May headline on an Auerbach survey put it, "Users Happy, Not Ecstatic With Packages." But they were using them.

And much the same sort of thing happened in connection with CW's October report on data base systems. Instead of a few pioneer-like stories, CW received so many manuscripts from "real live" users — and from those who finally rejected "data base" for their installations after studying the other options — that CW still hasn't run all of them.

The users' selectivity was reflected as well in the 1977 Datapro Software Honor Roll. Out of the hundreds of packages on the market, only 32 met the strict but not overwhelming thresholds set by the researchers to earn a place on the honor roll.

Vendors showed equal restraint. Over the past year, the news releases CW received described enhancements or extensions to established packages.

In some cases, the package built for a large CPU was adapted to a smaller one. The financial application packages from Software International, for example, were converted to run on small Burroughs systems.

And the Fortran subroutine library from International Scientific and Mathematical Libraries now includes a subset for Data General users.

IBM itself began to recognize its small systems needed more software than it provided at first. In January, the company offered Fortran for the System 3;, by March and April, both IBM and independent software firms were offering goodies for the Series/1.

Micros to Arrays

Microcomputer software showed up consistently during the year, most dramatically, perhaps, when the UK's CAP Microsoft introduced Microcobol in late February. National Semiconductor announced Nibl for its micros and Altair began offering business application packages for its unit in March.

At the other end of the scale, a package was introduced to help users of the Cray-1 and other array processors "vectorize" their Fortran problems.

That seems to complete the spectrum in terms of machine sizes. The planning currently under way for a "First World Computing Services Industry Conference," scheduled for Barcelona, Spain, next June and including both software and service company representatives, indicates the geographic scope of the user and the vendor ties that became evident in 1977.

'Pride-Logik' Adapted to General Use

CINCINNATI — Pride-Logik, a data and system dictionary package developed by M. Bryce & Associates, Inc. (MBA) for use with its Pride system design methodology, has been adapted by the vendor for more generalized use, a spokesman said.

The package enables a user working with any of several CPUs to show the logic behind "virtually all" of an organization's systems and data flows, taking into account people, places, documentation, files, records, systems and procedures, he said.

Pride-Logik provides cross-referencing, search techniques, design integrity analysis and redundancy checking. Display commands range from single component requests to requests for the entire set of stored components related to a given design effort; he claimed.

For forms and report control, Pride-Logik stores data used in both manual and automated systems. Its ability to trace data and logic flows and to identify all control reports designed into a system make the package useful to internal and external auditors, MBA added.

Pride-Logik is said to be able to run on any CPU with an ANS Cobol compiler and direct access storage facility. Versions are currently operational on Honeywell, Burroughs and IBM mainframes, requiring 40K words, 70K words and 128K bytes respectively.

The package costs $20,000, which includes manuals, forms training and consulting in addition to the software. MBA is at 1248 Springfield Pike, Cincinnati, Ohio 45215.

SAS Users Set Meeting

LAS VEGAS — Leaders in the computer performance measurement and evaluation field will be among those presenting invited papers to the SAS Users Group meeting at Caesar's Palace here late next month.

SAS is a general-purpose data management, analysis and report writing system that is heavily used for reduction and analysis of computer performance data. Performance analyst Barry Merrill of Suntech, Inc. will detail the steps involved in using SAS to tune an IBM MVS environment.

Kenneth W. Kolence of the Institute of Software Engineering will discuss the use of software physics in sizing workloads with SAS, while Mario Morino of Morino Associates, Inc. has chosen the topic "SAS: The Necessary Utility for Computer Performance and Control."

The conference, which will be held Jan. 30-Feb. 1, is sponsored by the SAS Users Group International.

The registration fee is $40 per person ($45 after Dec. 31); attendance is not limited to installations currently using SAS. The group can be reached at P.O. Box 10066, Raleigh, N.C. 27605.

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Mexican Baker Whips Up Total MIS by Mixing Mini, Young Programming Team

MONTERREY, Mexico — Few companies are as aggressive in switching from an archaic manual recordkeeping method to a computerized management information system (MIS) as Galletera Mexicana S.A. (Gamesa), the largest producer of cookies and crackers in Latin America with annual sales of more than $70 million. And fewer companies still have achieved such spectacular results in so short a time.

Last year, Gamesa's young management team began to implement an ambitious plan to apply computers to its operation, which, until then, had been run on often outdated and incomplete information. To set the plan into motion, Gamesa assembled a team of 20 systems analysts, programmers and computer operators — mostly young graduates of Monterrey's own Institute of Technology — and bought a Hewlett-Packard Co. 3000CX, the first to be installed in Mexico.

"Less than a year later, the team had completed enough programs to justify the exchange of the 128K-byte HP 3000CX for a new, more powerful 512K HP 3000 Series II," according to Gerardo C. Tamez, Gamesa's director of data systems, who at 28 is the oldest on the team. The computer was installed in September.

Initiation Rite

The initiation of the programmers came in the form of transferring payroll computation from a small, dedicated minicomputer to the larger HP 3000. "Payroll is a large task, considering there are 2,700 employees of which 2,000 are laborers who are paid daily," Tamez said. "To compound it all, there are graduated pay scales for about 500 different positions."

With payroll data and information on available workers collected from supervisors, the first step toward production planning could be taken — the compilation of daily work schedules assigning the right worker to the right job.

"Order backlog and management of inventories of packing materials and staples such as flour, sugar, oil and chocolate are handled by the computer now," Tamez said. "We have yet to include in our data base the status of the machines and ovens and what types of products can be made on them."

Since these important phases of production planning have not yet been completed, Gamesa has had, at times, to endure the annoyances of rescheduling its workers, which means shifting higher paid workers to lower paying tasks.

With more than 450 metric tons of baked goods emerging each day from 17 ovens the length of football fields, the completion of production planning gets first priority at Gamesa.

Centralized Planning

The implementation of the new system required a lot of reeducation, particularly of supervisors who were accustomed to manual recordkeeping. At present, production supervisors call in information to a central planning department where the data is entered via CRT terminals.

Later, they will be asked to mark cards to be read by an optical reader until eventually there will be CRT terminals at all data entry points.

Perhaps the programming team's greatest success so far has been in the area of distribution. From order processing, inventory control, truck scheduling, loading and shipping to invoicing, all are now working on-line. One result: faster turnaround of orders and improved customer service, Tamez said.

"We are also more than one-third along toward giving management a full financial report," he added. Sales forecasts, sales statistics, accounts receivable, sales commission records and expenses and costs are now available on the 3000.

Last month, tax files were added; they will soon be followed by accounts payable. By next year, Gamesa's management will be able to make decisions based on up-to-date production and financial reports called up via CRT terminals.

The effort of centralizing information parallels decentralizing of operations. At present, information from Gamesa's two outlying plants in Obregon and Mexico City and its 15 distribution centers is gathered manually and mailed to the headquarters in Monterrey once a month to be processed.

However, plans call for HP 2640 CRT terminals to be installed by the end of this year to enable daily transfer of pertinent data via modems and telephone lines to and from the HP 3000 data base. By the end of 1977, five more distribution warehouses are projected.

In its present configuration, the computer system consists of the 512K HP 3000 Series II, one 15M-byte disk, two 50M-byte disks, a 200- and a 1,250 line/min printer, three 120 char./sec teleprinters, a 600 card/min card reader, one 800- and one 1,600 bit/in. tape unit and 14 HP 2640 CRTs.

Process Control Next

What's ahead? Tamez and his department are already looking beyond their present goal of a total MIS to another major area: the use of minicomputers in process control.

"Speed of the belt, which controls baking time, and temperature within differently heated sections of the 100-meter long ovens are controlled manually," Tamez said. "Feedback for continuous belt control now comes via telephones from the end of the ovens. A controller will be much faster and more sensitive in making adjustments."

A recent 700% jump in the price of natural gas for industrial users has given new urgency to the project. When implemented early next year, minicomputer-controlled ovens are expected to save fuel by burning more efficiently.

Interconnection of the controllers with the HP 3000 will enable gas volume data to be included in up-to-date production cost computations and will yield extensive data on oven temperatures for studies.

Neat/3-Cobol Conversions Offered in North America

SAGINAW, Mich. — Four agents have been named by Computer Software Facilities Ltd. to market the Neat/3 to Cobol (Necol) package [CW, July 11] in the U.S. and Canada.

One of the distributors, Curry Computer Center here, is now offering the package on a service basis, keyed to number of lines to be converted from NCR's unique Neat/3 to ANS Cobol 74. The other agents have not yet announced their plans for Necol.

Curry will accept users' Neat/3 programs and do the conversion on the NCR Century 200 at the center, or it will ship a disk-based copy of the program to the user's site.

When it is shipped, the software is modified to be inoperative after it has converted a predetermined number of lines of code, a spokesman noted.

The technique Curry uses to "turn off" Necol is tolerant, however. The conversion of a program will continue until it is finished, even if the line limit is passed during the operation. But Necol will not accept any more work after that, the spokesman said.

Curry charges 10 cent/line for the Necol work with a minimum charge of $4,000, whether the work is done at the center or at the user site. Special help for instructions that can't be converted by Necol is available at extra cost, a spokesman said from 4600 Seidel here in Saginaw, Mich. 48602.

Canadian users can contact Curry through P.O. Box 2177, Niagara Falls, Ont. L2E 6Z3.

The other distributors include, for the northeastern states, James D. Hallman, P.O. Box 304, 335 E. Orange St., Lancaster, Pa; for the Southeast, Interactive Business Systems, P.O. Box 7207, 11616 Wilmar Blvd., Charlotte, N.C. 28217; and, for the western states, International Computer Technology Corp., 465 California St., San Francisco, Calif. 94104.

Spooler Eases DG Print Work

ATLANTA — The Spooler Utility now available from Technical Analysis Corp. (TAC) was designed to route printer output generated by Data General Corp. Novas and Eclipses to intermediate disk storage.

This not only avoids delays that sometimes occur because of the slowness of the target printer compared with the speed of the CPU, but also eliminates conflicts caused by more than one program needing the printer at the same time, a spokesman said.

It also permits printing to be done apart from the run that created the output, which may relieve pressure on the operators. Since the text of the reports are available on disk until they are overwritten, extra copies of the output poses no problem, he added.

Written in Business Basic, the spooler carries a license fee of $500, which covers the programs on magnetic tape and printed operator instructions.

TAC is at 120 W. Wieuca Road N.E., Atlanta, Ga. 30342.

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'Logout' Options Added

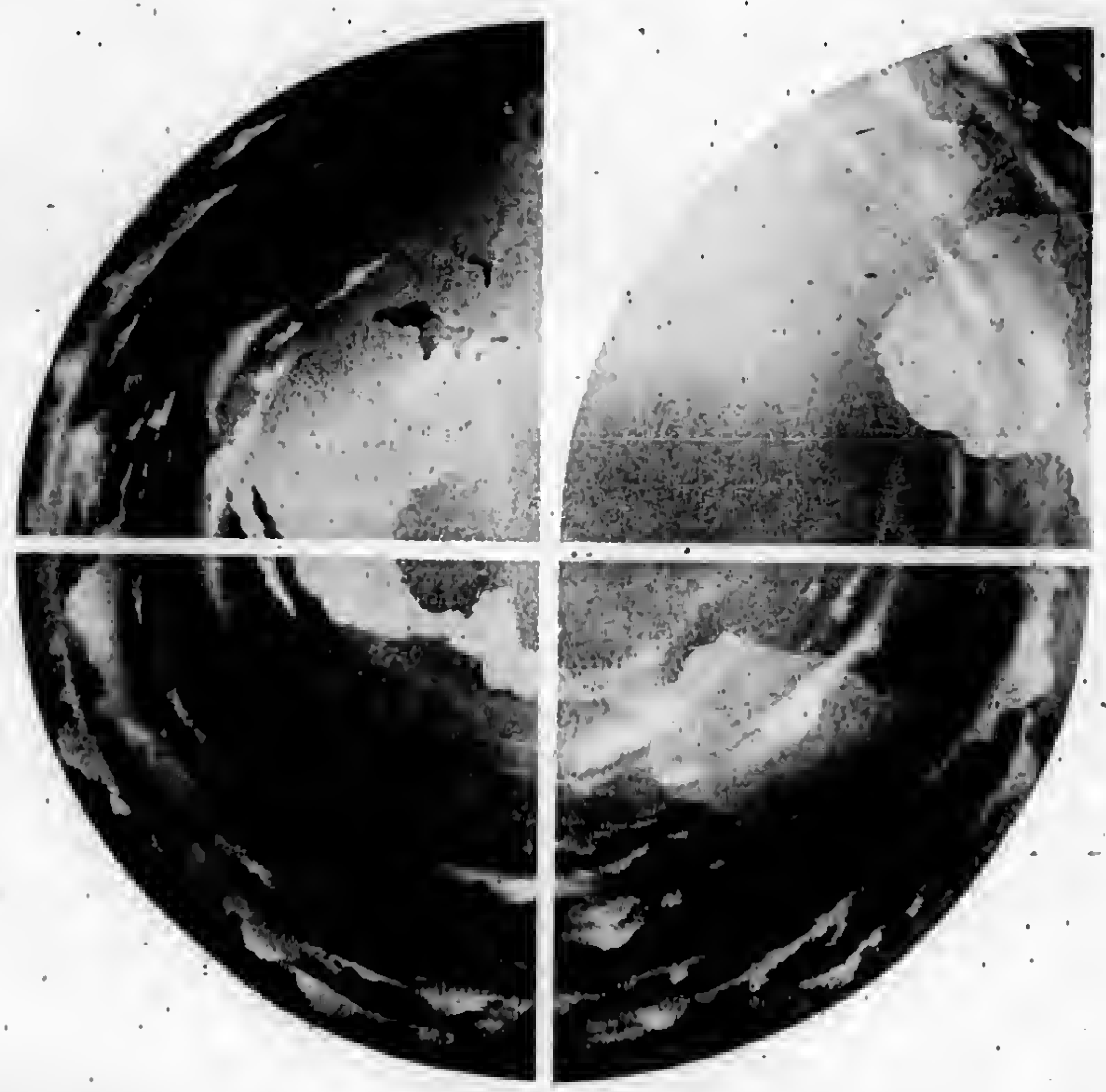
FAIRFIELD, N.J. — The Logout package, which reportedly routes DOS/VS console messages to a line printer to speed up most operator functions, has been enhanced with a pair of separately priced options, according to the vendor, Macro 4, Inc.

The Console Reply Queueing (CRQ) feature is said to treat any messages that require an operator response separately from the routine "status report" type of messages. CRQ stores the vital messages in a buffer and enables the operator to check if there are any outstanding.

In addition, the routine also prints a prompting message of its own on the console if any DOS/VS message is left unanswered for more than three minutes, a spokesman said. It provides an audible warning if messages from the DOS/VS Logical Transient area are pending, he added.

Analog, the second enhancement option, supports the creation and analysis of a file of historic log data. With Analog in place, the user can work through this file, applying his own selection criteria of what should be analyzed.

The base price for Logout remains $90/mo, while CRQ and Analog add another $15/mo and $10/mo respectively, he said from Gothic Plaza, 376 Hollywood Ave., Fairfield, N.J. 07006.



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Disk Space Manager Eases Work at DOS Site

TORONTO — "We now have effective on-line capability for testing, something we could not achieve before. That's an important asset when you consider we have some 700 homegrown programs that are continuously changing and we're developing others to meet the changing needs of the company."

That's Frank Farrell, program supervisor of the DP Department of Guardian Insurance of Canada, describing the results of his company's installation of a disk space allocation package.

The company offers all lines of general insurance throughout Canada; effective and rapid program testing on a configuration consisting of an IBM 370/138 is a response to the ongoing growth in the life and general insurance sectors.

"We face very tight deadlines and the requirement to test rapidly and effectively is always with us," Farrell explained. "What interested us in Easyspace, therefore, was the enhanced flexibility it gave us to move easily in several directions without impeding ongoing operations.

"Today not only can we perform effective on-line testing — something we could not do prior to acquiring the package from Valve Computing, Inc. — but we can test several times a day without disrupting schedules. In short, we have been released from 'conventional constraints.' "

Heavy Tape User

Farrell pointed out that the DP Department is a heavy tape user and testing of the programs requiring tapes had to be run in batch mode. To do the job it is doing now, the department would have had to acquire four additional tape drives.

"We could also see our disk scratch space requirements growing, and Easyspace immediately cut those requirements," he added.

Easyspace is a system enhancement for DOS/VS users that allows runtime allocation of scratch disk work space from a pool of available space and the conversion of files from tape to disk without program changes. It addresses the problem of assigning disk workspace to applications and reportedly eliminates the programming effort required to interchange tape and disk files.

Previously, the DP Department defined the physical disk pack and track extent areas to be used for scratch space; because this resulted in contention between programs for disk space, the system would "prohibit" some jobs from running concurrently.

Since the installation of Easyspace, however, all scratch space is retained in a pool and is assigned as needed on a nonconflicting basis. Scratch disk files are made partition-unique at runtime, Farrell noted.

Clarification

The evaluation of the Cray-1 array processor at Los Alamos Scientific Laboratory (LASL) [CW, Dec. 12] took place from March to October 1976, when the software supplied by Cray Research was as the story showed. Since then, however, an operating system and a compiler have been developed and refined, a Cray spokesman stressed.

A final, detailed report of the LASL Cray study (identified as publication LA-6456-MS) was written by the lab's Tom W. Keller and is available free as long as supplies last from LASL, Los Alamos, N.M. 87545.

The report is also available (for $5) through the National Technical Information Service, P.O. Box 1553, 5285 Port Royal Road, Springfield, Va. 22151.

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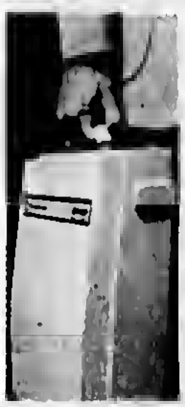

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While Bell Bill Suffered

SNA, Interfaces Stirred Debate in '77

By Ronald A. Frank
CW Staff

Network architectures, interface standards and anticompetition legislative efforts were among the major issues affecting data communications users during 1977.

IBM's Systems Network Architecture (SNA) became a controversial subject when at mid-year, Howard Frank, president of the consulting firm Network Analysis Corp., said the IBM architecture had serious limitations and would require major modifications if it were to overcome its inflexibilities.

Several months later, a *Computerworld* survey showed that out of 20 large communications users, only 20% had made a commitment to SNA and 25% had rejected it. The survey also showed that 40% were uncertain about the impact of SNA.

In November, consultant Dixon Doll said DP vendors had not properly accepted the existence of the public packet networks. Doll cited SNA's limited compatibility with the CCITT X.25 protocol as an example of interfacing that had to be improved.

By the end of the year, most major mainframe/terminal vendors had introduced their own versions of a network architecture. But in many cases these were constructed mainly to encourage use of the vendor's equipment rather than optimize packet network interfacing for the user.

NCR introduced its architecture in August and joined others such as IBM, Univac, Digital Equipment Corp. and Burroughs Corp. in trying to establish an X.25-compatible environment for both present and future network users.

In April, Raytheon Data Systems Co. became one of the first terminal suppliers to provide a direct X.25 interface when it introduced an intelligent CRT that utilized software developed by Cambridge Telecommunications, Inc. Shortly thereafter, Telenet introduced X.25-compatible concentrators for use in its packet net.

Datapac Begins Operations

And in Canada, Datapac finally began operating using its Standard Network Access Protocol (Snap) version of the CCITT X.25 standard. Although at communications conferences there were some impressive intercontinental demonstrations linking various packet nets, packet technology was still far from general use by users.

In the meantime, some users perceived a threat that existing private-line flat-rate facilities might be shifted to measured time services. This concept was first raised by the Italian postal, telephone and telegraph authority at a meeting of the Consultative Committee on International Telephone and Telegraph (CCITT) and other evidence developed during the year.

Although the Consumer Communications Reform Act was regarded as a threat to competition at the beginning of 1977, its impact appeared blunted as the months went by. In February, a joint resolution was introduced in Congress by Rep. Timothy Wirth (D-Col.) and others counteracting the intent of the Bell-sponsored act and reaffirming the concept of Federal Communications Commission (FCC)-approved competition.

In December, a telephone industry task force came up with a new proposal that was regarded as slightly more liberal than the reform act, but specialized carriers and other industry sources said it would still eliminate many of the service choices now available to domestic network users.

Throughout the year, the question of where communications stopped and DP started remained unsolved despite the reopened Computer Inquiry before the FCC. Even the issues of whether the Bell Dataspeed 40/4 was a DP device or not remained open after a U.S. appeals court heard oral arguments on the issue.

In September, CW published specifications of the still-unannounced Bell Data Network (BDN) which, most observers agreed, looked more like a DP service than an offering provided by a common carrier. At year's end, there was still no announcement from Bell about BDN and it was generally accepted that its introduction would depend on how the Computer Inquiry defined the boundary between DP and communications.

During the year, the American National Standards Institute (Ansi) began work on a datagram addition to the X.25 standard and this was meant to provide a second interface alternative to users along with the X.25 virtual circuit approach. Although detailed in nature, it was said that the datagram approach would give users more end-to-end control over their packets on public data networks.

One of the most important instances of user involvement in communications issues occurred when the Tele-Communications Association (TCA) took a united stand in opposition to Bell's Consumer Communications Reform Act. Unlike other user organizations, which kept out of the limelight, the TCA decided that the only way user interests could be protected was for it to speak out. The user group issued several position papers and sent representatives to Washington to testify about user needs.

Despite the promise of improved services and equipment, the year ended with users depending mainly on the same types of networks that had been available for a number of years. Satellite Business Systems (SBS) began to discuss the services it would be providing to users, but this capability was not scheduled to be available before 1981.

Paradyne Modem-Sharing Unit Handles Four Data Terminals

LARGO, Fla. — Paradyne Corp. has introduced the Model 835 modem-sharing device (MSD) which lets up to four stand-alone intelligent terminals or four clustered terminal control units communicate through a single modem.

The modem-sharing device reportedly allows users to lower their line costs through point-to-point communications links between remote locations and a central site. Modem-sharing allows users to save the cost of the multiple lines which would otherwise have to be run, a spokesman said.

The Model 835 MSD is said to reduce the number of stand-alone modems required in data communications networks by up to 75%. The unit acts as a serial distributor that accepts control signals required for data transmission from I/O devices and passes them along to modems, the company said.

Intelligence provided in the modem-sharing device accepts only one request-to-send signal from one modem at any time. The other modems are locked out until the modem at the other end of the line has received an end-of-transmission message.

A rotary switch on the front panel of the modem-sharing device alows operators to manually halt transmission from any of the four modems connected if a modem enters the streaming mode.

Most modem-sharing devices currently on the market either depend on a network control system to handle streaming conditions or else require that the streaming device be physically disconnected, the spokesman said.

Terminals or control units can be linked to the Paradyne modem-sharing device through RS-232 connectors, and the device can be attached to any of the four modems.

The Model 835 MSD costs $550 or rents for $50/mo on a two-year lease. Deliveries are 30 days from Paradyne Corp., 8550 Ulmerton Road, Largo, Fla. 33540.

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At Large-Scale Installations

Multiple Micros Ease Front-End Processing

By John R. Laughlin
Special to CW

Microprocessors continue to revolutionize the computer industry—but primarily the revolutions are in small-scale devices which give credence to the "micro" aspect of "microprocessors."

Although microprocessors are increasingly associated with network switches and data controllers, it is only recently that serious thought has been given to their use in large-scale installations. In order to function in this environment, it was necessary to design multiple-CPU systems that could work in conjunction with other computers to distribute a large-scale processing load.

Design criteria for facilitating a distributed processing system with a minimum of user-disruption include:

- The system must continue to employ the user's mainframe to eliminate program conversion — but must off-load the mainframe to reduce cost.
- The front-end communications processor must not only serve as a terminal handler, but also must be able to serve as a sophisticated switch in a network of CPUs as well as an independent minicomputer system.
- The data base management system (DBMS) itself would be executed in firmware (microcode) as an independent processor accessable by all CPUs connected through the front-end processor.

Such a configuration would be more flexible, less costly and far more efficient than conventional solutions to these related problems, since "processing" of a variety of functions would be done by dedicated microprocessors specifically chosen and programmed for that function. The system would consist of three modules, each of which is a multiple-microcomputer system (see diagram on Page 23).

The specific microprocessor-based modules are:

- A powerful minicomputer system which provides terminal handling capability and serves as the data controller to the DBMS processor.
- Multiple medium-speed channel interfaces between the minicomputer and the mainframe computer(s).
- A DBMS processor linked to the minicomputer via a variable speed channel interface.

The minicomputer is composed out of a network of microprocessors and offers a full complement of both system-level and application-level pro-

(Continued on Page 23)

AJ Brings Out Coupler/Modem

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has unveiled the AJ 1245, a Bell 103 and 202 mode-compatible acoustic coupler and modem in one unit.

The 1245 was designed to handle the transfer of low- and medium-speed data over the normal voice-grade telephone lines using a telephone handset, AJ said.

The AJ 1245 will interface with any EIA terminal and communicate acoustically up to 450 bit/sec in 103 mode and to 1,200 bit/sec in 202 mode. The user can switch-select between these two models with the coupler automatically adjusting speed and interface protocol, according to a spokesman.

In the acoustic mode, the 1245 automatically switches to the manual Data Access Arrangement (DAA) modem when the DAA cable is connected. The AJ 1245 costs $795.

AJ also announced a lower price of $595 for the Adac 1200 acoustic data coupler and a 36-month lease plan at $30/mo.

The Adac 1200 transmits and receives data at 1,200 bit/sec either acoustically or over the dial-up telephone network with a DAA.

AJ is at 521 Charcot Ave., San Jose, Calif. 95131.

Can off-the-rack softwear fit you like a glove?

A special report on *Applications Packages* in the January 30th *Computerworld.*

When the applications program you write yourself costs five times as much as a package you can buy off the shelf, "canned" software has a lot of appeal. Off the shelf software has become more attractive for vendors, too. Many small system manufacturers, for example, have found that applications software sales can add 15% or 25% to their hardware revenues. And more companies than ever before are entering the market with new software products for a wider range of applications — with ever greater modularity.

We'll be taking a close look at the subject in our January 30th special report, titled *Applications Packages.* Edited by Don Leavitt, this report will summarize the latest information available — including products, vendor strategy and market activity. In problem/solution format, the report will feature user experiences in the evaluation, selection, installation and use of applications packages, as well as topics like these.

- Converting programs and files from one hardware or operating system to another — examining the effort required.
- A statistical evaluation of commercial software — survey analysis.
- A review of vendor support for training and installation, and for installed packages affected by government regulations.
- Applications options offered to users through remote computing services.
- An overview of the industry — how vendors are expanding into new applications areas; adapting current lines to different CPU's; or consolidating product line to concentrate in selected areas of expertise.

If you're an MIS executive, DP Manager, Supervisor or Lead Programmer, our January 30th special report should be on your reading list. If you market programming products or services, you should put this report on your ad calendar. Ad closing date is January 13. Your *Computerworld* salesman can give you complete details. Or reserve your ad space today with a call to Terry Williams at (617) 965-5800.

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Multiple-Micro Front End Developed for Large Users

(Continued from Page 22)

grams in addition to its communications processing function.

Among the features of the minicomputer which would be critical to an efficient system are multiple central processing elements, each of which shares all of main memory; multiple microprocessors to serve as I/O channel controllers and terminal handlers; and field-upgradability of all components, including CPUs.

The channel interface between the minicomputer and the installed mainframes must offer throughput of up to 200,000 char./sec. From the mainframe side of the channel-to-channel interface, the minicomputer (and its peripheral devices) must look like a high-performance tape drive to the mainframe computer so programs running on the mainframe can use standard access methods and can thus effect either batch or interactive data transfers.

A variety of interface configurations must be available to increase throughput and maximize configuration flexibility. When traffic between a single mainframe and the minicomputer reaches a high-volume level, additional channel-to-channel interfaces may be connected between the CPUs.

In addition to providing multiple links between the two mainframes, a single minicomputer will serve as the center of a "star" configuration through which multiple CPUs are linked. Not only will the minicomputer thus serve to switch traffic between these CPUs, it will also serve as a central data base accessed by a variety of distributed processors.

Of course, in such a star configuration, each mainframe processor can have more than one channel link to the minicomputer.

Heterogeneous Processors

Each DBMS central processor will consist of up to 16 independent processors. Each of these processors has its own read-only memory and random-access memory and executes an instruction stream completely independent of the other processors.

In addition to the memory directly associated with an individual processor, all processors share a common memory used for passing information between the processors, primarily in the form of buffers.

Unlike other "multiple-CPU" systems, the central processors in the DBMS processor are heterogeneous: each of them has varying characteristics which make them each optimally suited for their specific function. Not only do the performance characteristics of each processor vary, so do their instruction sets.

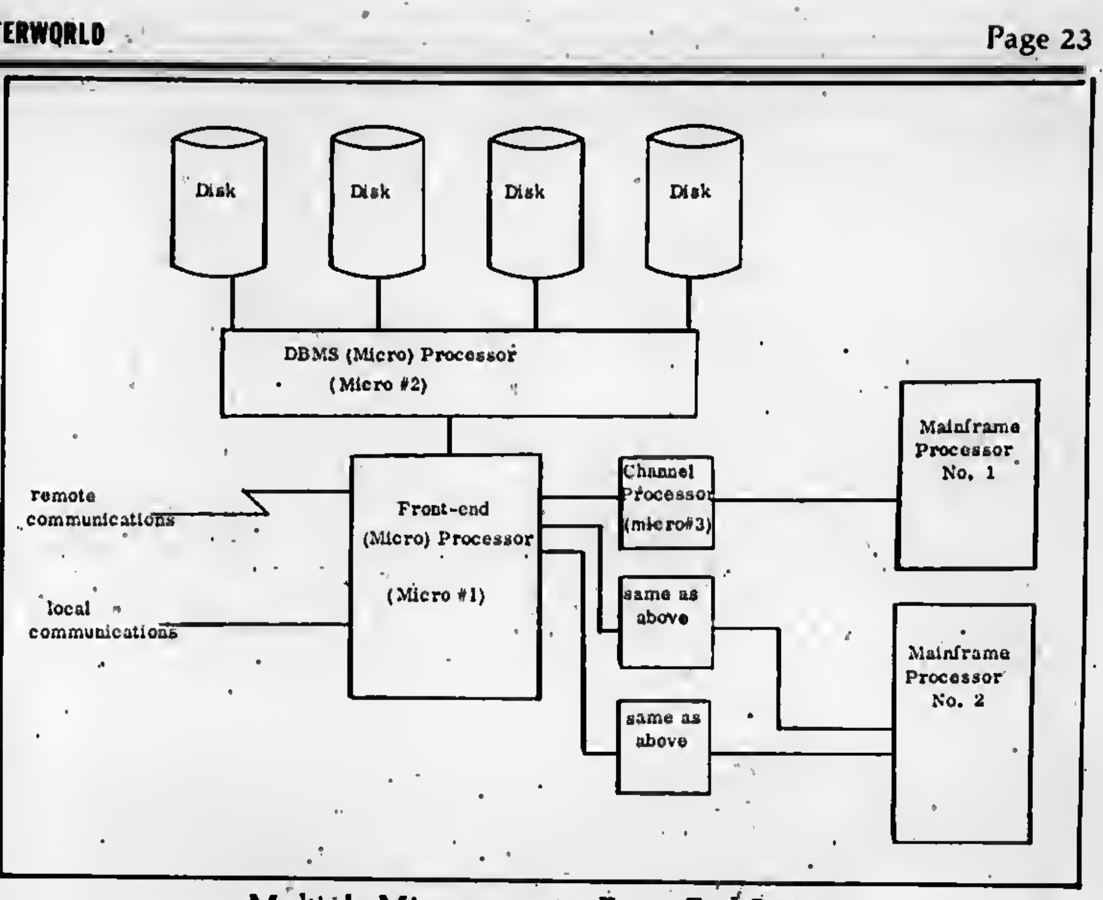
For example, the specific processor which handles the "sort" function in the DBMS processor will be a very different piece of hardware than the processor that would handle the "lookup" function.

Once the individuality of the processors is understood, it becomes apparent why it is difficult to differentiate between "hardware" and "software" in the DBMS processor system. For example, the function known as "sorting" is no longer performed by code executed by the "CPU," but rather is the specific function of a microcoded "processor" which does nothing but perform this function.

Several important concepts should be apparent from the foregoing. Of some importance is the relevance of micros to large mainframe users.

More significant, however, is the change that microcomputers will effect on our thinking about what constitutes a "computer." A "computer" is no longer simply a monolithic device for fast arithmetic; instead, it is a series of unique, related processors, each contributing to the efficient management of the system.

Laughlin is president of Digital Systems Corp. of Walkersville, Md.



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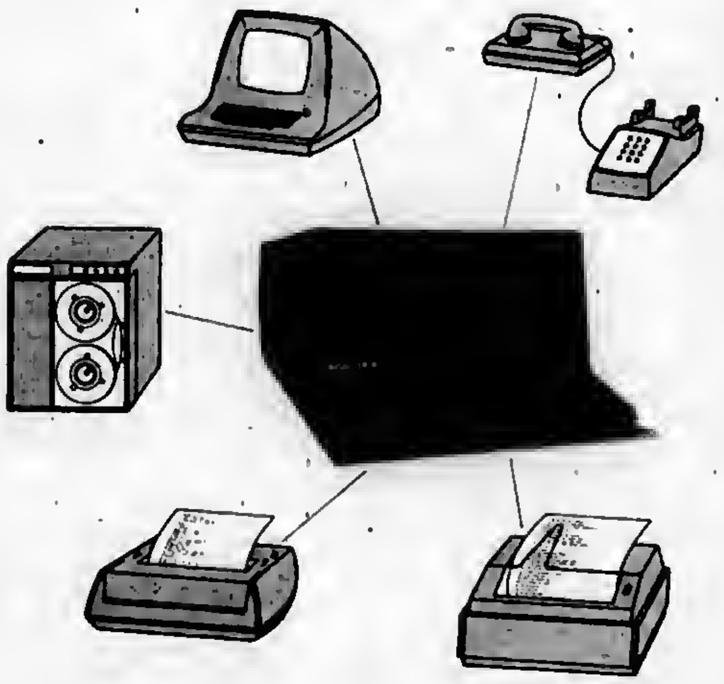

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Response Monitor Handles Multidrop Nets

SALT LAKE CITY, Utah — Questronics, Inc. has introduced a monitor that is reportedly capable of keeping track of response time on asynchronous and bisynchronous multidrop terminal networks.

The Model 300 response time monitor can be connected to a terminal either through an optical coupler, where indicator lights display a transaction in progress, or via an RS-232C bridge connection, the firm said.

The unit maintains a running average of response time, the number of transactions that have occurred, minimum and maximum response time and the last transaction time. These are shown on a four-digit LED display along with the name of the particular category involved, a spokesman noted.

Data rates of 75-, 110-, 300-, 600-, 1,200-, 2,400-, 4,800- and 9,600 bit/sec can be monitored with response time monitoring on either half- or full-duplex circuits, the spokesman said.

In the bisynchronous mode, the control unit and device addresses are switch-selectable into the monitor and response time information is received by observing the data flow on the communications link.

Resolution of the monitor is said to be .1 sec with a maximum display of 9,999 possible.

The monitor and interfacing cables cost $1,500 from Questronics at 3565 South West Temple, Salt Lake City, Utah 84115.

Tiger From Micon Turns TV Into T/S Terminal

OAKLAND, Calif. — A unit that can reportedly transform a standard television set into a time-sharing terminal via the antenna input has been announced by Micon Industries.

The Television Interface General-Purpose Economy Remote (Tiger) terminal contains an acoustic coupler for communications with remote time-sharing computers, a full Ascii keyboard and an RS-232C connector as a computer interface, according to a spokesman.

Up to 1,024 characters can be simultaneously displayed in switch-selectable formats for eight or 16 lines or 32- or 64 char./line, he added.

The Tiger unit sells for $500 from Micon at 252 Oak St., Oakland, Calif. 94607.

Trivex Has CRT 3277-Compatible

COSTA MESA, Calif. — A 480-character CRT said to be plug-compatible with IBM 3271-2 and 3272-2 controllers is available from Trivex, Inc.

The Model 0771 is organized into 12 lines of 40 characters each. It offers a variety of enhancements including local display-to-print, 10-key numeric pad, light pen, optical character recognition wand, operator prompting line, cursor position display, cluster diagnostics and response time indicator, Trivex said.

The response time indicator displays average response time, number of transactions, maximum response time and number of responses above a preset response time threshold. The response time threshold is variable from 0- to 30 sec, the firm said.

The price of the Model 0771 480 character display is $2,950. The three-year lease rate is $79/mo including maintenance. Trivex is at 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alphanumerics. But now there's a bright new graphics terminal that has a lot to say for itself.

Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just $5500* it will dazzle you with a virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumerics, you can do auto-plots with or without words and figures on the screen.

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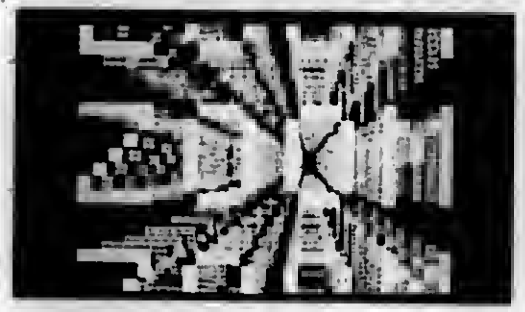

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Peripherals Area Quiet

Processors, Price Moves Led '77 Action

By E. Drake Lundell Jr.
CW Staff

Processors and price were the key words for the mainframe manufacturers during 1977, while the usually turbulent world of peripherals seemed to pause during the year.

Clearly, IBM's announcement of the three members of the 30 Series family topped off the processor news, but most other major mainframers also had spectacular announcements of their own.

And all the while, the plug-compatible CPU manufacturers — Amdahl Corp., Itel Corp. and Control Data Corp. — were getting enough systems out in the field to show that they could be viable forces in the computer marketplace.

This in turn may have forced IBM into the drastic price cutting on its 370 line of equipment, which also marked the past year.

But while all of this was going on in the world of mainframes, there was very little activity in the peripherals marketplace in terms of new products or concepts. Rather, the competitors that have made it through the turbulent shakeups in that field in the past continued to fill orders — probably glad that the furious pace of innovation has slowed somewhat.

On the mainframe front, Honeywell Information Systems, Inc. started the action in January with the introduction of the 66/85 and three mid-range machines in the 64 series.

Then, in February, Burroughs Corp. brought out the 7800 to compete with IBM 370/168 class machines.

While the mainframe area was quiet in March, the action really picked up in April, when IBM took a meat cleaver to the prices of its entire 370 line and introduced the 3033 processor, the first machine in what was to become the 30 Series.

Like the others to come in this series, the 3033 was just a processor announcement, with IBM apparently deciding to keep the 370 family of peripherals in operation for a while longer through processor-only upgrades.

Most of the industry reacted to the IBM price changes with juggling of its own, bringing a whole new — lower — price structure to the computer marketplace.

Also in April, the AS/5 from Itel received its first customer checkout which showed it was competitive with the IBM 158.

In May, NCR Corp. brought out three mid-range machines in the 8000 series and CDC moved into the plug-compatible CPU market with the Omega 480, in two versions, to compete with the IBM 138 and 148.

CDC's entry upped to three the number of firms chipping away at IBM's market by offering users cheaper CPUs that could run IBM software with no changes.

The summer was a quiet time for the mainframers, but October brought announcement after announcement.

IBM began it all with the long-awaited introduction of the 3031 and 3032, which drastically shifted the price/performance ratio in the industry.

Itel quickly reacted with the introduction of the AS/6 to compete against the new price/performance standard, while Amdahl stood pat with its line in processors.

Univac also reacted in October with the largest new product announcement in its history — five mainframes, two in the 90 series and three in the 1100 series. All were pegged to the new IBM price/performance levels.

Burroughs also chose October for the introduction of the B6817, perhaps giving that month the record for mainframe introductions, with nine machines being launched.

In November, HIS finally caught up with the others and announced a restructuring of its 68 line with the introduction of the 68/Distributed Processing System. The firm said the new machines were more powerful than their IBM counterparts, but didn't release any technical information to back up those claims.

And then as the year drew to a close, NCR topped off its 8000 Series with the V8580 to compete in the 370/148 market and the V8590 to go into the market for IBM 3031 class machines. The two are the most powerful NCR processors yet.

Micrographics '78 Slated for Boston

WASHINGTON, D.C. — The National Micrographics Association (NMA) has announced that its 27th Annual Conference and Exposition, "Micrographics '78: Building Information Bridges," will be held in Boston on May 9-12 at the Sheraton-Boston Hotel and the adjacent John B. Hynes Auditorium.

Following the opening of the general session on Tuesday, May 9, afternoon seminars will be devoted to micrographic applications in such emerging markets as banking and finance, engineering systems, health and medicine, insurance and retail/wholesale areas. Preconference seminars on May 8 will offer information on the fundamentals of micrographics for those less familiar with the technology.

The 23 educational sessions tentatively scheduled for Wednesday and Thursday will feature such topics as competing system technologies, equipment analysis and system design.

Wrapping up the conference on Friday will be a discussion on the role of micrographics in the "Office of the Future."

Information on the conference may be obtained from the association at 8728 Colesville Road, Silver Spring, Md. 20910.

EMM Add-On for IBM 370/148 Helps First User Cut Downtime

LOS ANGELES — The first user of Electronic Memories & Magnetics (EMM) add-on memory for an IBM 370/148 mainframe reports having virtually no downtime caused by memory failures.

CMS Industries, Inc., a service bureau that features on-line teleprocessing, found that it outgrew its 370/145 and decided to go to a 370/148. At the same time, the company made the decision to include independent add-on memory in the replacement system, a spokesman explained. The firm needed additional memory capacity and felt that installing independent add-on was the least expensive way to get it.

"Our increased growth rate required a more powerful machine than the 370/145 we've had for the past several years. We decided to go with the 370/148 because the cost/performance ratios met our criteria," according to Tosh Nakahiro, president. We hurriedly put in an order to EMM for add-on memory. We knew that it had just announced the product, but we wanted to be the first in line. We agreed to be the engineering test site because of [EMM's] past performance record with CMS."

CMS installed the 370/148 with 2M bytes of IBM memory and an additional 1M byte of EMM memory.

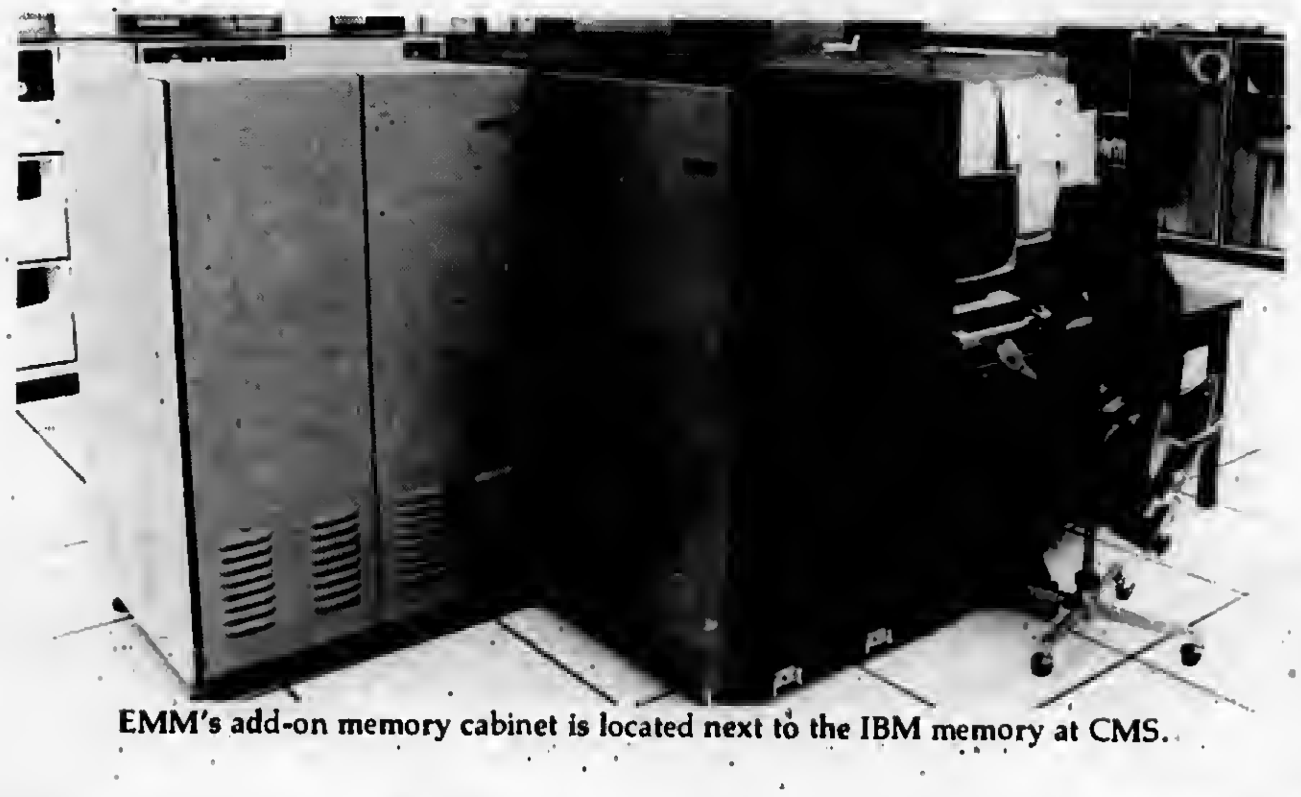
The CMS DP operation utilizes 3350 disk drives and 1403 printers. More than 100 terminal locations are spread throughout the U.S. and Canada. The terminals, manufactured by IBM, Sycor, Inc., Olivetti Corp. and Four-Phase Systems, Inc., communicate over a telephone network.

Two Major Benefits

One of the main considerations in selecting and staying with EMM memory was that it is compatible with the IBM system, Nakahiro noted. "We are getting two major benefits with [the] memory. First, we can give our users improved terminal response time and we can evaluate Multiple Virtual Storage (MVS) on the 148," he said, adding that running MVS efficiently on the 148 will be beneficial to both CMS and its customers in the long run.

CMS is an on-line operation and, therefore, installation time was an important factor. EMM installed the 1M byte in 12 hours. "We have had an excellent record of support from EMM and always good response time on service," Nakahiro noted.

CMS is now handling more than 4 million transactions per year, and the installation of the 148 and add-on memory will allow the firm to keep up with growth projections. In fact, the firm plans to add another 1M byte of EMM memory, Nakahiro reported.



EMM's add-on memory cabinet is located next to the IBM memory at CMS.

Switches Designed for IBM Users

ANAHEIM, Calif. — California Computer Products, Inc. (Calcomp) has announced the availability of IBM plug-compatible peripheral switches and associated energy-saving devices. The products are designed for users of multiple IBM systems.

The peripheral switch, Model 1000, is architecturally and operationally compatible with IBM 360s and 370s, according to a spokesman. The switch is available in matrix sizes from 2 by 4 through 8 by 24 and is designed to allow switching of up to eight channels between 24 controllers.

The Model 1010 energy control subsystem lets users centrally control power on/off functions for all control units, according to the spokesman.

Both models are manufactured by Dataswitch Corp., East Norwalk, Conn.

Prices for the Model 1000 range from $26,000 to $350,000, depending upon switch configuration and the number of energy control subsystems required. Lease terms are also available. Calcomp is providing maintenance, the firm said from 2411 W. La Palma, Anaheim, Calif. 92801.

Bendix Has Digitizer, Mapping System

ANN ARBOR, Mich. — An Interactive Design, Drafting and Mapping System and a microprocessor-controlled digitizer have been announced by the Bendix Corp.'s Aerospace Systems Division.

The Datagrid II mapping system is an expandable 20K random-access memory (RAM) microprocessor unit that allows the interactive placement and editing of lines, circles, arcs, symbols and text, according to the firm. The unit features a "menu" picking function and free-moving cursor to assist the operator in drawing applications and also has a CRT terminal with keyboard to permit editing and annotating, a spokesman said.

The system can also be interfaced to several available plotters for final output, he added.

The Datagrid II Digitizer incorporates an expandable 16-bit, 8K RAM microprocessor, a large grid work surface, a powered lift pedestal base, a keyboard display console, cassette-loaded software and an applications software library, the firm said.

A digitizing program is included to guide the operator through the set-up procedure and then monitor the work for procedural errors by providing a display of prompting messages, a spokesman said.

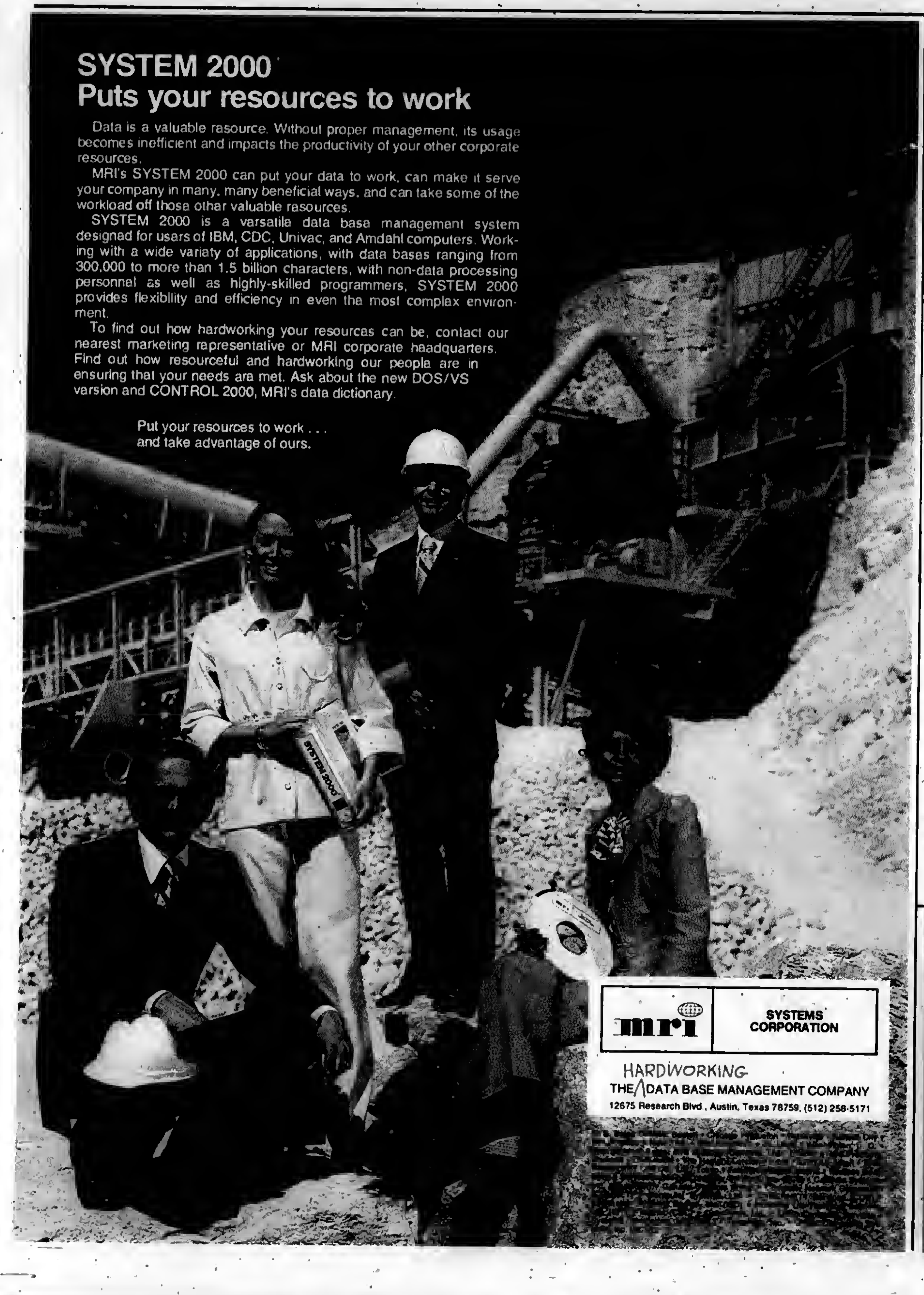
The Interactive Mapping System costs $38,990 and the digitizer is priced at $18,990 from the firm at 3621 S. State Road, Ann Arbor, Mich. 48107.

MDS 2300 Gets Drum Printers

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has introduced two drum printers designed for remote job entry (RJE) and document processing applications on its System 2300 computer.

The models 2441 and 2442 use a 64-char. set rated at 600 line/min and 900 line/min respectively and a 96-char. set rated at 435 line/min and 660 line/min, a spokesman said. Both printers offer a 132-column format, he explained.

Price of the 2441 is $20,600 or it can be leased for $685/mo. The 2442 rents for $930/mo or can be purchased for $30,000 from MDS, 1599 Littleton Road, Parsippany, N.J. 07054.



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Air Force Picks Halon With Workers in Mind

TINKER AIR FORCE BASE, Okla. — The Air Force has begun using Halon 1301 as a means of chemically smothering a fire in a computer facility without exposing workers to the possible health hazards of a chemical fire suppressant.

Halon 1301 is an odorless, colorless, electrically nonconductive gas known to the chemist as CF^3Br, or monobromotrifluoromethane. To Air Force fire protection and DP personnel, it's one of the most promising improvements since the automatic sprinkler, they said.

The chemical is so effective that an average concentration of only 5% by volume, reached in 10 seconds, will extinguish most fires, an Air Force spokesman noted. This figure is even more significant when compared with the 40% concentration required for the commonly used carbon dioxide.

Halon 1301 is also safe and effective against all three classes of fires — Class A, cellulosic material: Class B, flammable liquid; and Class C, electrical, he said.

A silent guardian, the Halon 1301 dispersal nozzle, is seen in the upper right hand corner. The computer tape storage vault requires careful fire protection.

No Residue

The 552nd Airborne Warning and Control (Awac) Wing chose Halon 1301 because the chemical's two greatest advantages — cleanliness and personnel safety — were suited to protect high-value, high-voltage areas, according to the spokesman.

Water and other liquid agents were ruled out of the question; foam would have left a residue and might cause equipment damage.

"Products of combustion" methods unleashed corrosive agents, which are dangerous to both people and equipment, the spokesman pointed out.

So Halon 1301 was selected. As a vaporizing agent, it leaves no residue and it has no effect on the data which is stored on magnetic tapes, the spokesman said.

In addition, a single molecule of Halon 1301 is smaller than a molecule of air and will easily clear the head on a disk.

Following a 1301 discharge, there are only slight traces of smoke and a faint, acrid smell. Visibility is uninpaired and the low toxidity (Underwriter Laboratories classifies Halon 1301 in Group 6 — least toxic) means personnel can reenter the area where a fire has ocurred and resume operations immediately.

The most intriguing part of the Halon 1301 story is how it actually puts the fire out, according to the spokesman. It extinguishes by chemical action; it does not "smother" the fire by oxygen exclusion or cool the combustibles below the flame point or separate the fuel from its oxidizer.

Instead, the Halon compound reacts with the transient combustion products responsible for rapid and violent flame propagation. This reaction terminates the combustion chain reaction.

Halon 1301 is actually dispensed from pressurized, rechargeable storage containers through corkscrew-shaped nozzles. A blasting cap type of mechanism causes spontaneous release.

Being heavier than air, the gas moves down from ceiling to floor, "flooding" the area and rendering it inert. This method is appropriate for fixed enclosures such as computer rooms where underfloor areas containing wiring also require protection.

Halon 1301's low toxicity has been confirmed by the U.S. Army Chemical Center, Underwriters' Laboratories, Kettering Laboratory and others. All tests show the 5% concentration, for 10 seconds, to be extremely safe, the spokesman noted.

In fact, only at 7% concentration and higher, for prolonged periods, is slight difficulty in mental concentration observed, he said.

Safety Margin Proved

This safety margin was twice proven in actual operations at Tinker. Once the Halon 1301 system activated in the wing's flight simulator, the spokesman recalled, probably because of a power surge during a strong electrical storm.

When the fire department arrived three or four minutes later, Joe K. Clanton, the shift station chief, remarked "I didn't smell anything — no odor of smoke at all. A faint haze in the room looked like smoke, but there was no damage, no residue and no signs the gas had actually been released."

When Halon 1301 was discharged in the mission simulator (activated manually when a fire was suspected, a witness described the event like this: "I heard what sounded like a well-muffled shotgun blast. A few feet in front of me, I could clearly see the dispersal nozze and a narrow beam of grayish fog spilling out.

"But three feet from the tip, the gas became invisible. The flow lasted about three seconds, then nothing.

"Only a slight odor remained, not overpowering, but it reminded me of fish and burnt rubber and lingered for an hour or more."

A close-up of the corkscrew shaped nozzle shows how Halon 1301 gas is dispersed. The gas is broken into a 120° discharge cone of mist, heavy enough to settle from ceiling to floor and completely fill the room in approximately five seconds.

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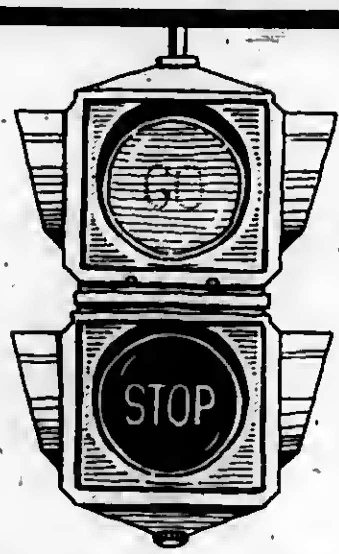

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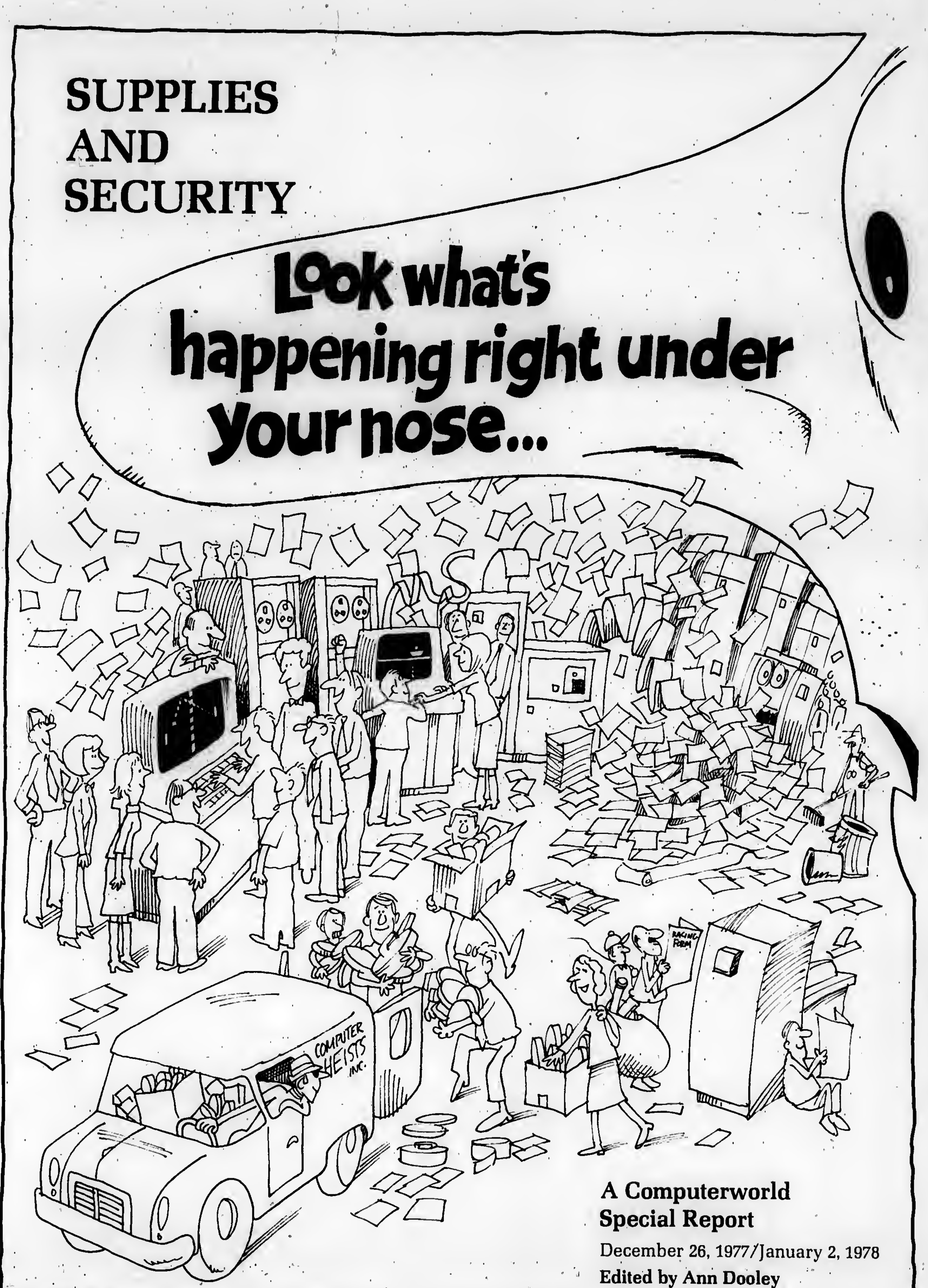
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A Computerworld Special Report

December 26, 1977/January 2, 1978

Edited by Ann Dooley

Need Information Safeguards

DP Protection Goes Beyond Physical Security

By Stanley J. Murawski
Special to CW

Today, almost every organization has a physical security system to control access to the computer system in the data center. However, breaches of security that can have the most dramatic impact on a firm are directed at the information within the system, not the computer system itself.

It is estimated that today there are over 200,000 computers worldwide. By 1985, this figure will grow to over 450,000. The major growth area of computer usage is on-line and time-sharing networks where remote access to the system is widespread. And by 1980 it is estimated that more than 3 million terminals will be in use around the country.

If computer usage rises as estimated, and computer abuse grows proportionately, it is estimated that in the U.S. alone, we will incur an annual loss of well over $100 million from breaches of security.

Many managers have too much confidence in their computer systems. They do not realize the value of the information maintained by the computer system and have no true concept of how vulnerable that information is.

It is therefore important that data center management continuously assess their operations to ensure achievement of the proper balance between the operation of computer systems and the control of information assets.

The problem of increased system security arises out of a combination of management's information needs, new government regulations and the advancement of computer technology.

Managers at all levels have become increasingly dependent on the DP system for the information they need to plan, evaluate and control their organization's activities. Today's advanced economy has evolved to a point of extreme sophistication and so have the bases for our assets. We have moved from business based on physical assets to business based on a virtual asset — information.

Most of this information is stored magnetically within a computer system. In the banking industry, for example, banks hold assets of deposit on computer files. Most of the money in our economy does not really exist. Many of the stocks and bonds also do not physically exist.

Since in these instances computerized information represents the business, it has, in fact, become the business. This means that running the computer system efficiently may be one of today's most important organizational functions.

However, how much upper management attention is placed on the security of this operation and its information? Generally, very little; yet its loss could put them out of business.

Finally, the changes within the DP industry's technology have been rapid in order to keep pace with management's information needs and government requirements. For example, the phenomenal growth of data bsae and data communications systems is at the heart of a rapidly increasing ability to store and process information. The amount of information available for on-line access in many organizations would have been staggering to the imagination 10 years ago. On an IBM 360, today's systems would have been declared economically, if not physically, impossible.

Areas of Vulnerability

Vulnerability to computer abuse can come from many quarters.

Functional vulnerabilities include poor controls over manual handling of input/output data; weak or nonexistent physical access control, computer and terminal operations procedures; and weaknesses in business ethics. Others include weaknesses in the control of computer programs, poor controls over access through impersonation to time-sharing services and

(Continued on Page S/4)

End-User Education Essential

Quality of Supplies One Factor in Security

By Robert Phillip Baker
Special to CW

Security for a DP installation depends on whether the end user can become educated to the realities of the DP supply industry and marketplace. This education will ultimately lead to optimum performance at the computer site and conscientious management efforts. An operational axiom that can serve and benefit both a vendor and end user in achieving this education in security can be established.

The marketplace for DP supplies has matured and is now declining. Relative to most large industries, it has been volatile and swift in its evolutionary process. But here is the snag. Service to the end user has never been a reflection of the consumer's needs, but more often than not a reflection of the vendor's capabilities.

The marketplace is becoming increasingly competitive, supply being greater than demand, while at the same time the total service capabilities existing within the industry are not on par with the exact needs of the consumer. A sales and service organization is needed to fill the gap between what end users actually need and what they have been getting for products and service.

In an attempt to demystify these diverse products and bring some common denominator of quality, service and pricing into effect, the directors of Computer Supply Corp. began research into all areas of DP supplies.

Recycling Developed

Several years ago in this country, there was a sudden shortage of magnetic computer tape. Panic gripped the industry and was evident in almost every computer site in the country. During this panic an important yet extremely simple and virtually unknown concept was developed; recycle magnetic tape.

The basic logic of all recycled products is the reuse of the raw materials involved in manufacture. In this instance, recycling was made as simple as possible because the basic structure of the product did not have to be altered, only a duplication of the last stage of manufacture: cleaning, certification and packaging.

The existing quality standard for this product was researched and found to be inadequate. New product testing procedures and policies were adopted and refined, resulting in far greater performance. Today, "recertified" magnetic tape is being recognized as a viable and sometimes preferable alternative to the purchase of new tape.

Although as logical and necessary as magentic tape recycling is, the rehabilitation of the disk pack poses some minor manufacturing problems and some major marketing problems. The product itself is more complex and is, overall, what might be called a mechanical device, rather than a passive device such as magnetic computer tape.

If remanufactured improperly in any one of several stages, a reconditioned pack can cause severe damage to the drive upon which it is mounted. In recognition of these factors, careful consideration must be given to quality control and adherence to the exact specifications of manufacture of the

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Shared Backup Facility Reduces Investment

By Louis Scoma Jr.
Special to CW

How long could your company stay in business should your computer center be destroyed? What would happen to your momentum? Your cash flow? Your competitive edge?

Answers to these questions could determine whether your company should establish a recovery operation center (ROC). One of the lastest developments in contingency/recovery planning, a ROC provides a company with an off-site facility from which it can continue its computer operations essential to the firm's success.

Off-site backup facilities were not necessary in the past because companies agreed to share their computers with one another. Typically, a company would line up two or three firms that would be willing to back it up should it have a problem — whether fire, explosion or machine trouble.

This arrangement is not practical for many companies today because they simply don't have the time on their computers to share. They generally depend on their computers around the clock, seven days a week.

Also, most computers are unique in their configurations and operating systems. It would require major changes and time to make two different systems compatible.

Companies with identical systems also could find themselves in a dilemma. For example, let's assume a computer operation requires on-line processing (i.e., the company's computer is connected to either another computer or a remote terminal at another workstation). While the user might be fortunate to locate a company

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On the Inside

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Off-Site Backup Systems Need Careful Plans

By Eric Vesely
Special to CW

Most computer installations and users maintain backup capability in the form of tape copies of disks and tapes, usually stored off-site. This simple procedure was established years ago in an effort to protect the user from hardware malfunction, operator error and the like, which can destroy data essential to the everyday operation of the facility itself and/or manufacturing processes.

While most companies are now protected from loss of essential data, more and more concern is pointed toward:

- Loss of computer equipment.
- Loss of computer facility.
- Loss of programming/operations staff and their facilities.

These possibilities all exist today — when one considers the possibilities of sabotage, natural calamity and energy failure. What does a company do if it's entire computing capability is wiped out by, say, a major flood of the sort experienced in Kansas City this year? The disk and tape copies stored off-site provide no assistance if there is no computing equipment and staff to process it.

An event of this magnitude means destruction of the computing arm of the company. It can also slow down or completely halt assembly lines, marketing efforts, billing/accounting and financial measurements.

Every top executive must be concerned with this possibility — the possibility of catastrophe — and plan for such an occurrence.

One method of avoiding a disaster to the recovery process is to provide a backup capability with an identical configuration to the original. (If it is *not* identical, then plans must be made to convert all existing programs immediately so they can execute on the backup configuration.)

As new programs are developed, they too must be converted. Of course, the objective is to minimize the conversion costs. Also, where the concern is for a catastrophe of larger proportions such as a major earthquake affecting a large area, backup capability might also be arranged outside of the local area.

Another method is to establish operations staff contingency planning. Under a catastrophe condition, do they move to the backup facility? What are the costs, be it a local or distant backup facility?

A third method of disaster recovery is to provide programming and analyst capabilty. In order to continue program maintenance and development, a backup site (not necessarily the same as the computer backup site) must be planned for.

These are only three major considerations which should be of utmost importance to any executive concerned with the well-being of his company. Obviously, there are many more such methods, and many of these will relate directly to the specific type of computer operation being handled.

Don't tell yourself you have a handle on the problem until you can respond yes to all the following questions:

Do I have storage that protects my off-site data from partial (i.e., warp, water damage) as well as complete (i.e., fire) destruction.?

Do I have signed agreements for hardware backup, specific hardware and detailed personnel plans in case the unthinkable happens?

Have I run tests on my backup hardware, checked for mismatches in the system and corrected these?

Do I continually review my plans, look for problem areas and update regularly in light of changing conditions?

Vesely is vice-president of Systems 37, a software and service firm.

Bank Backup Ensures Confidence

By Fred G. DaCosta
Special to CW

The banking community is unusually dependent upon the public's confidence, not in any one particular banking corporation, but in the industry as a whole, to withstand the winds of monetary, fiscal, political and social change. Within the DP world, the industry also recognizes the potential for confidence loss caused by an interruption in banking operations of any one member of that industry.

Thus, many members of the banking fraternity have recognized it is in their respective best interests to ensure that the very financial institutions with whom they compete will be allowed to process critical bank applications on one another's compatible hardware/-software in the event of an emergency.

We know, of course, that procurement of computer time at a compatible site (possibly that of a competitor) is dependent upon a number of conditions, not the least of which is the availability of unused system time at the donor site in view of the latter's daily work requirements.

The term "competitor" is employed here with deliberation, for it is essential to remember that most banks are dependent upon magnetic ink character recognition (Micr) reader/sorters for the input processing of their high volume applications; thus the building of input files cannot necessarily be accomplished at just any CPU-compatible location. This competitive condition is alleviated when the backup (donor) site is located at a point outside city, county, state or other regional competitive barriers.

In any event, peripheral requirements may dictate the selection of another bank data center over that of a manufacturer with whom the distressed institution had maintained a healthy business relationship.

Preconceived Idea

Thus it is critical that the distressed bank have a preconceived idea of what applications are the most important in order to continue operations the following business day. Perhaps only four, six, or eight "wall-clock" hours of computer time will be available to the troubled institution. Thus, the need arises to determine which modules, programs and software are extraneous, relative to users' minimum requirements.

The same logic applies to the donor bank. There is a reciprocal aspect to the relationship between the two banks in question. Internal or external emergencies may require "today's" donor to be "tomorrow's" user of "borrowed time." The need to accommodate the distressed bank today requires some degree of imagination on the part of the donor installation, perhaps some compromise of its ordinary processing cycles. It is, therefore, equally important for the potential donor installation to assess its minimum requirements and forego the execution of certain jobs ordinarily processed.

The establishment of priorities of system and application processing is not a spontaneous one, to be made under crisis conditions. In fact, the sophisticated organizational structures of many financial institutions prevent such a decision, or at least the authorization and approval of same, from being made by any one individual.

The bank's DP department, functioning as a user servicing division, may likely recommend actions from a hardware utilization standpoint. But the senior management representatives of demand deposits, commercial loan, payroll/customer services, savings, trust, mortgage, etc., have been known to discuss at length the relative importance of each of these applications prior to determining the processing sequence of those systems.

In particular, the issues of which programs are to be deleted, and which reports are not absolutely necessary to users, constitutes an area of much contention. On the other hand, contractual arrangements with customers may preclude certain deletions.

In addition, certain constraints are introduced when the programs of one system, e.g., payroll, require access to the files of another system, e.g., savings, demand deposit, automated clearinghouse.

Still another by-product of such decision-making exists in the utilization of this "game plan" within one's own environment, following recovery from conditions which earlier had deprived the data center of its ability to process. That is, the same priorities can be employed in-house to provide users with not less than a minimum of required data within hours.

As with all aspects of contingency processing plans, it remains that sufficient forethought and periodic review of these matters is warranted to ensure the concept's continued applicability.

DaCosta is a national bank examiner at the office of the Comptroller of the Currency of National Banks.

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Data Protection More Than Physical Security

(Continued from Page S/2)

weaknesses of tape control.

Violations in these areas can produce loss of data integrity, loss of data confidentiality and loss or delay of system availability.

Considerable sums of money have been and will be invested in physical security — both physical access and fire protection. Basic physical protection is an absolute necessity. However, far too much of the security investment has been made in these areas of relatively low exposure.

About 50% to 80% of all losses are due to errors or omissions. Ten percent to 15% of the losses are the result of disgruntled or dishonest employees. These statistics illustrate the relatively low importance of physical security.

In the area of data integrity, management must consider those times when data has been exposed to accidental or malicious alteration or destruction as well as incomplete data. Data confidentiality can be violated by the misuse of information by those authorized to use it for limited purposes or by lack of protection from unauthorized exposure.

Finally, system availability should be considered. This is when the system isn't available and functioning to fulfill information needs.

The next step beyond physical security is the establishment of controls over access to and updating of important information within the computing system, or "logical security."

Since the vast majority of losses are accomplished by the organizations' own employees (either through errors or intent), it is logical then to limit the capacity of users to access information they might consider "their data."

This means specific functions should be authorized as opposed to the users of that function. For example, the jobs in the payroll system should be allowed to access the payroll master, but only if they are running payroll programs and only at the time these jobs are scheduled.

This concept of "functional" authorization is quite different from authorizing the people in payroll to do anything within the payroll master.

Considerable discussion has been carried on regarding logical security. However, it is a bit like the weather. No one has done much about it.

One of the reasons for this lack of action has been a failure to specifically identify the heart of the problem to be solved. The other, of course, has been the lack of reasonable solutions in terms of implementation, operational cost and ease of use.

Some noble experiments have been conducted and some impressive systems developed. However, few have proven generally feasible when evaluated for long-term use by commercial organizations.

A logical security system must be able to fit into the existing organizational and DP structure with a minimum amount of disruption. It must be flexible enough to allow for existing shop standards on data sets and users names as well as accounting information structure.

The user should be able to migrate into a protected environment in a step-by-step fashion as data is added to the body of protected information.

Possibly the most important information to protect is the software system. This includes both vendor-supplied software as well as in-house applications programs. An organization's software investment is enormous. Its loss could easily cause the failure of a company.

Because of this, the operating system load libraries — those libraries essential to the operation of the computer — should probably be the first items protected. The next order of priority should be the general system libraries and critical production load libraries.

Once this is done, a continuing comprehensive protection scheme should be developed.

The ultimate question to be anwered by data center and corporate management alike is how well will the company function without some, part or all of its computerized information.

If the answer to this question is poorly or not at all, then it's time to look at the total computer security picture. That goes beyond locks on the doors. It includes protection of the information within the system — a company's most important and valuable asset.

Murawski is product manager for Boole & Babbage's Operations Division.

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Quality of Supplies Plays Role in DP Site Security

(Continued from Page S/2)

original product.

The third and last recycling concept is one that at the time was not "new," but presented several challenges in the way of quality enhancement and more competitive pricing and delivery. The product and an industry-wide negative concept was termed "reprocessing." As stated, the basic logic of the recycle was already in existence, but with more research it was found that the current remanufacturing process was extremely limited and entirely unsatisfactory, resulting in a "second class" product and an industry-wide negative stigma. This necessitated the development of certain proprietary techniques, again reaching that place where the recycled product was to perform at least as well as the original product, if not better, as in the case of printer ribbons.

Recycling Vital

The logic of recycling included the common denominators of quality and pricing. The recycling process enables end user unit costs to be lowered anywhere from 50% to 300%. Here we have "smart" selling and reflectively "smart" buying. Recycling is not only logical, based upon materials utilization, i.e. cost savings, but becomes vital when conceptualized as an overall philosophy toward supplies and security.

One-half of the project to identify consumers' needs and how to fulfill them was completed in that now the DP supply user was educated to the benefits of recycling and could opt for recycled products, thus obtaining optimum value and performance.

Before total security could be guaranteed, however, a still larger void had to be filled. The specification and application of the product consumed ran parallel to a tenet of total commitment of service. A simple and honest guarantee was needed that reflected the esteem of the DP personnel and the integrity of a supplier. Any product, for any reason, at any time could be returned for replacement or refund.

The archetypal sales manipulation, where a customer must be concerned with being misled or taken advantage of by a salesman, was no longer necessary. Rather a customer should be able to learn and gain understanding through the salesman's expertise, though objective analysis by the salesman of a customer's need might result in directing the consumer to purchase from a more qualifed vendor, one that could even better serve the customer's needs. This is the salesmanship of a sales professional.

The best way for the consumer to obtain a product, then, is to deal with an organization that will be objective about his needs and will supply him with accurate and informative data to help him answer any and all questions.

Baker is president and chairman of the board of Computer Supply Corp.

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Shared Backup Facility Lowers Investment

(Continued from Page S/2)

with time to share and with a compatible configuration and operating system, the user would still be unable to operate the on-line processing job because its communications system would not be connected to the other computer.

Many managers also think computer manufacturers can supply them with a computer and have it installed in a "couple of days."

Unfortunately, managers who operate on this assumption do so with a false sense of security. Although computer manufactuers will try to get a computer to a company as quickly as possible, it will take them longer than a "couple of days" to set it up — and that's only one piece of the puzzle.

When disaster strikes a computer center, it often means electricians, communications specialists, contractors and other suppliers must be called in to rebuild the facility. A firm might have a new computer, but no place to install it for several weeks or even months.

Contingency Plan

Before setting up a ROC or becoming a member of a group that plans to share in a center, the user should conduct a thorough risk analysis of the company's needs and develop a contingency/recovery plan.

The risk analysis will determine the effect and losses the company would have in its business momentum, competitive edge and cash flow should its DP center be destroyed. The study also should reveal the essential data necessary to operate during an emergency.

To help define, quantify, set priorities and put into perspective the major objectives for development of an overall corporate plan, a five-phase approach is recommended. Typically, a phased approach tailored to meet the needs of a company is beneficial from the standpoint of resource utilization and establishment of objectives. It also provides periodic milestone reporting of progress and problems to senior management.

If a fire destroyed your company's computer center, how quickly could you recover?

The five phases are:

Phase I — Initial Planning

- Orient staff on contingency/recovery planning.
- Develop objectives, goals and responsibilities.
- Determine scope of activities.
- Develop inital task/task force work matrix.
- Review and analyze existing documentation, studies and reports.
- Develop initial milestones, project definitions and resources.

Phase II — Fact-Gathering

- Assemble inventories of files, systems, applications, documentation and other computer-related components.
- Define problem(s).
- Specify guidelines for non-DP requirements such as insurance, legal and auditing.
- Update and finalize project schedule to completion.

Phase III — Analysis

- Problem resolution(s).
- Cost analysis.
- New or revised procedures as required.
- Outline for emergency recovery documentation.

Phase IV — Preparation of Plans

- Emergency actions, training and recovery checklists.

Phase V — Test Plan

- Develop scenario, conduct recovery exercise, post-exercise workshop.

By compiling this information, a user will be able to decide if a ROC would be a feasible investment. If it is, the next step would be to evaluate data pertaining to cost, operational requirements and location.

Cost is a factor. The user might find it's too expensive to build an off-site computer center only for his company as insurance on a "what-if" basis.

ROC Network

To reduce that expensive initial investment, several companies are planning to participate in a national ROC network in their own areas.

The ROCs will provide each member with its own necessary data communication network for on-line processing, electrical power, air conditioning, raised flooring and equipment that will require a long lead time to order such as communication modems, scanners and check sorters — all of which are essential for some corporate computer operations.

The cost to prepare a ROC is estimated to be approximately $750,000. However, with 10 members sharing the facility the cost per member would be $75,000 before taxes, or $39,000 for each member after taxes, if all costs are shared equally.

This makes it a reasonable investment for a corporation to prepare a ROC to back up its computer operations.

Operational requirements for each member firm would vary. For example, one member might need 10,000 sq. ft. of raised floor space while the others might be able to get by with a minimum of 2,500 sq. ft. of raised floor space.

Location is important. It should be within reasonable proximity to its members and it should be in an area reasonably safe from earthquakes, tornadoes, floods, hurricanes and power shortages.

Additional questions which must be answered include: How many personnel will be assigned to the center? How many shifts will be required? What services — such as security guards, janitorial and parking — will be needed?

The manner in which a ROC is used varies from company to company. Some groups plans to use it only until their primary computer centers are repaired and in operation. Other groups are thinking about installing a computer in their ROC to use for testing and systems development projects. This will enable them to take a load off the day-to-day demands made on their primary computers.

Of course, all companies don't need a ROC.

But for companies that can't afford to operate without their computers for any given period of time the ROC may be a whole new approach to security.

Scoma is president of Data Processing Security, Inc., a computer consulting firm.

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Using Cost-Effective Methods

Good Security Based on Detailed Risk Analysis

By T.Q. Stevenson
Special to CW

Concern for security has grown rapidly in the past several years. Good security is based on a risk analysis, which helps determine where possible exposure is and how much there is. It also helps tell the manager what could be done to reduce the exposure and how much the reduction will cost. However, risk analysis can itself be expensive. So it should be performed with careful forethought and use of cost-effective methods.

The general activities in risk analysis are:

- Gaining a commitment by management to undertake the study and to act upon its recommendation.
- Setting up a risk analysis team which represents the key units involved in data processing. The team should have a clear charter and corresponding authority to conduct the study.
- Defining need for security. Defining security needs includes evaluating the sensitivity of items in the DP environment to compromise. The data and software, the processing of data and the capital investments in facilities and equipment have certain values to the DP organization and to the owner of the data or software.

A possible intruder may also assign a worth to these items. Compromise may be by disclosure for data and software or by modification or destruction of data, software, processing operations, facilities and equipment.

Sensitivity Categories

A compromise may also be just a slowdown in processing certain data. Sensitivity should be measured in four categories: data integrity, data confidentiality, operational reliability and asset integrity.

Defining a need for security should also include evaluating potential costs of loss if a compromise should occur in the four sensitivity categories. These costs should also relate to values to the DP function, user (subject or data owner) and to any possible intruder. Does data value decrease with time, is a program proprietary, is money handled or is inventory data processed? Answers to these and other questions are required to properly evaluate costs of loss.

Another aspect is evaluating possible threats which may cause compromise to occur in the four sensitivity categories. These should be lists of reasonable types of occurrences. The lists should include those small, apparently harmless problems such as temporarily lost files, misrouted output, etc. Complete scenarios and simple events should be considered.

Calculating the annual cost of loss is yet another aspect. This value is often labeled the Annual Loss Expectancy (ALE). The ALE is the sum of the products of potential costs of loss and frequencies of compromise for each sensitivity category. The installation ALE is the sum of the category ALEs.

- Evaluating existing security by the four categories — data integrity, data confidentiality, operational reliability and asset integrity. One must know current conditions to make improvements. The results of this activity should correlate and be compared with those of evaluating sensitivity. Weak areas are easily identified as well as areas which may be overly protected.
- Designing protective measures from the results of the sensitivity, threat, frequency and ALE evaluations. These measures will identify which applications or assets will have average or high protection, as well as where risk exposure will be tolerated.

The strategies may separate or combine treatment of the risk by sensitivity category. Then the specific detailed safeguards can be analyzed.

Finally, the specific protection measures should be assembled into two or more proposed systems of protection. The costs and loss reductions for each proposal are required along with cost per dollar of loss reduction.

- Reporting to management is the final step, but communication to management should not be limited to this activity. It is required throughout the analysis to inform and to help develop a prudent security system. The final report should propose at least two options.

These general activities are sometimes combined or rearranged depending on the particular method of risk analysis. A good method considers all items in the DP environment, but requires minimal labor and time while yielding valid results. There are several possible techniques for reducing costs, including simple sensitivity ratings, sampling procedures and order of magnitude estimation.

An important concept related to risk analysis is that it is a task which should be conducted periodically. Conditions change from year to year and the first study may yield results which are hard to validate. Subsequent studies will accommodate changing conditions and refine and support prior work. Objectivity and reasonableness of estimates are essential also for validity.

Stevenson is a computer specialist with the U.S. Department of Agriculture.

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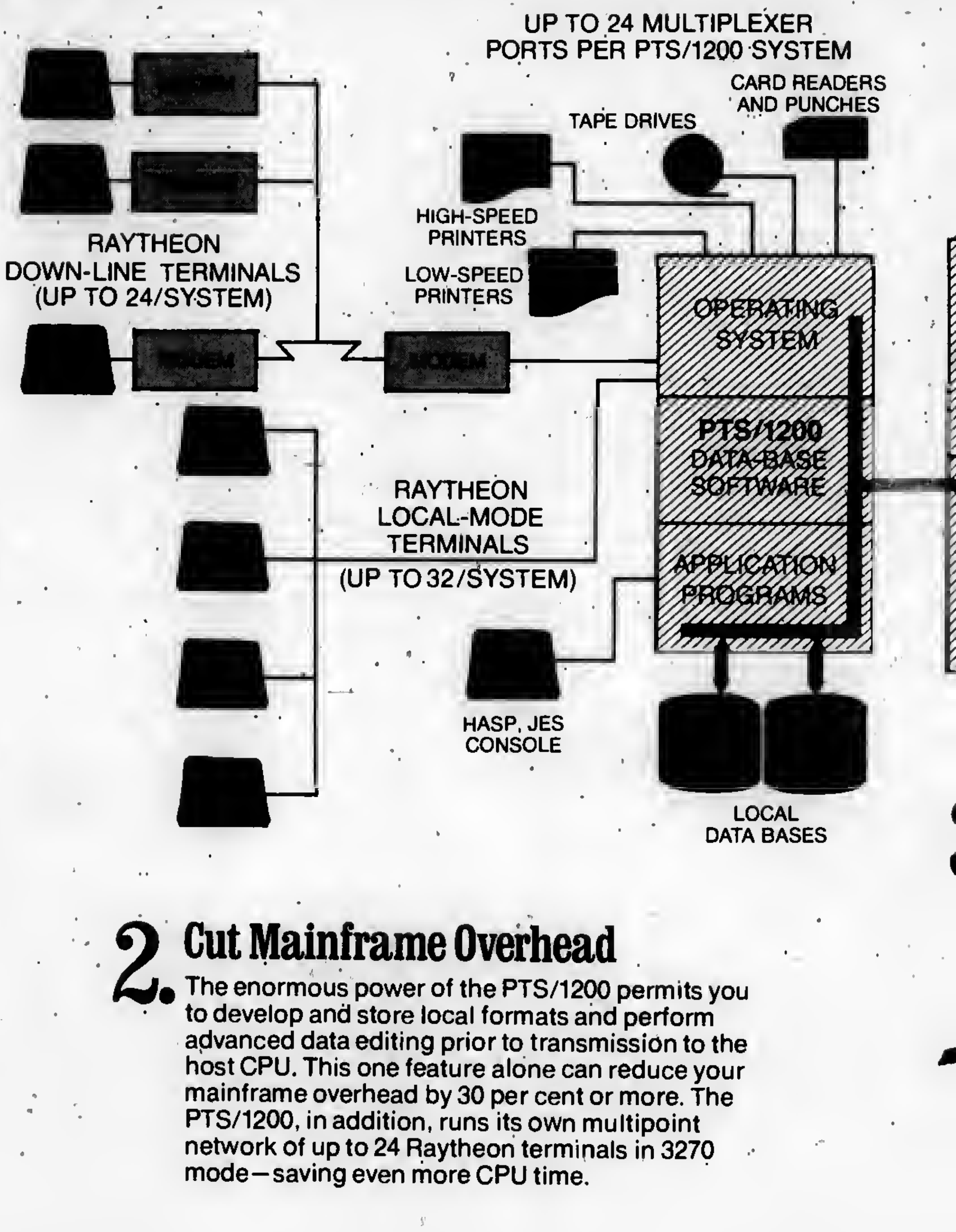
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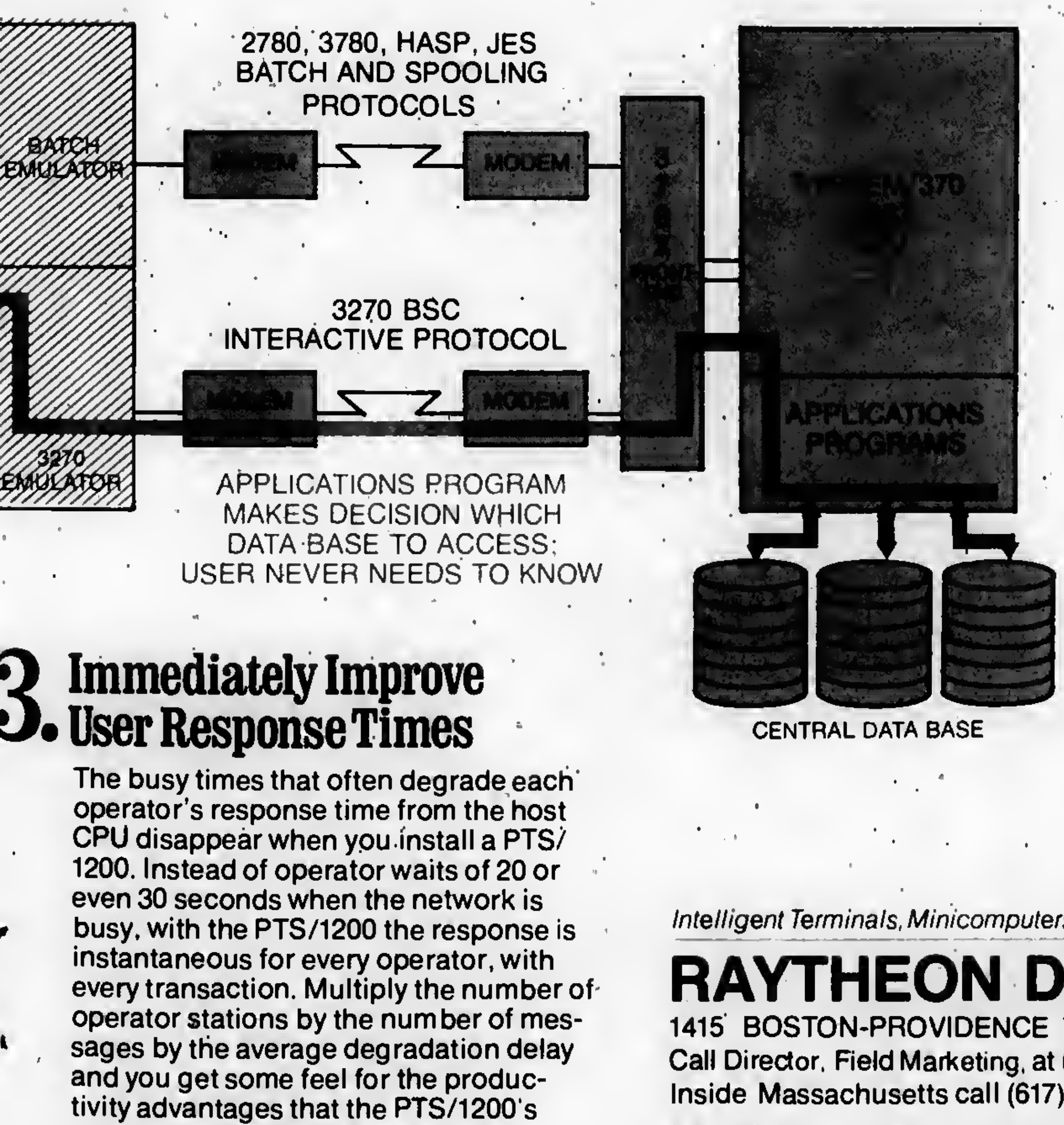
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Wide Range of Tape, Disk Capabilities Offered

By S.H. Tullman
Special to CW

The evolution of computers into machines of various looks, sizes and applications has brought a corresponding growth in magnetic media such as computer tape, disk packs, disk cartridges, data modules and floppy disks.

The important difference between tape and disk is in the way the information is organized and stored and consequently used by the computer. On computer tape, information is stored and has to be processed in sequence, whereas on disk products, information is stored in specific places on the disk and can be reached at random.

A simple example is processing the information on a name and address file. On tape, all names would be listed alphabetically from Aaron to Zwicker, and if you want to change Zwicker's address you would have to read all the way through the tape to find Zwicker. But on a disk you would skip all of the areas with names from A to Y and look only where the Zs are stored, so you would find Zwicker in a fraction of a second.

So time is a key factor to consider when deciding which type of storage medium to use. Whereas tape can store much more information for the money than a disk can, tape is quite slow. A tape recorded at 1,600 bit/in. could contain as much information as a whole disk pack and cost as little as 10% of what that particular disk pack costs, but it may take much more computer time to process tape-stored information.

The most common and oldest of all the media products is computer tape. It is generally 1/2 in. wide and comes in lengths from 200 ft to 3,200 ft and a common version is a 2,400 ft roll on a 10-1/2 in. tape reel.

Today most tape is written at a density of 1,600 bit/in. on 9 tracks. If one compares that with the familiar punched card it means the 2,400 ft reel can store as much data as 250,000 punched cards.

Most manufacturers offer a premium and a regular grade of computer tape. The usual difference between the products is how thoroughly and to what standards the product has been tested or certified. Certification generally means data has actually been written on each reel and then read back to make sure there were no errors.

Tape is manufactured by coating wide rolls of polyester film with an oxide mixture, which looks like light brown paint. This coated roll is then slit into 1/2 in. wide tapes which are then wound into individual reels.

The slitting process is an especially critical manufacturing step. Since oxide is like paint, a sloppy job of slitting tape will literally produce a ragged edge of oxide which can shed debris on the tape during use and produce errors.

After slitting, the tape is cleaned and checked to make sure it will meet all necessary specifications. The coating, slitting, cleaning and testing of computer tape is all done in special "clean room" manufacturing areas.

Over the last 10 years tape has generally become less expensive while improving in quality. Prices are not expected to fall any further and at approximately $10 to $15 a reel, tape is what *Consumer Reports* might call a "best buy" in magnetic media.

Disk Media

The other most common media products are disks, which include disk cartridges, disk packs and data modules. Disk cartridges generally consist of one platter or disk inside a sealed plastic housing. Disk packs have stacks of platters, as few as three or four or as many as 12.

Data modules are the latest generation of disk packs and these have read/write heads and access mechanism built right into the unit. (Regular disk packs do not.) Disk packs are just stacks of platters the read/write heads and access mechanism are part of the drive.

A disk works in much the same way as a record. Let's say that you only want to hear one line of a song and that line is in the 10th groove. You could put the tone arm right into the

(Continued on Page S/12)

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'Planted' in Cabinet

Simulated Bomb Threat Uncovers Security Holes

By Ken Lord
Special to CW

Many companies have an emergency disaster plan to protect their computer equipment and data, even though such a plan is rarely or never tested.

Other companies do not even have a plan. One such company was concerned about security and protection of its facility and in 1975 hired an investigator to study its security needs.

One section of that investigation simulated a bomb threat emergency and occurred as follows:

The investigator planted a small package — a white jewelry box tied with a pink ribbon and containing a note — inside the communication cabinet of the facility's computer.

The next morning, the investigator advised an employee of the existence of a simulated emergency and presented him with a list of persons to be assembled in a meeting. Representatives of all departments met with the investigator in the facility's conference room, where he announced the existence of a planted "bomb" and stated the group had 45 minutes to find it.

It would seem logical that the facility should have:

- Had a plan for such a contingency — other than just notification of civil facilities. No such plan existed.
- Planned for leadership for the search of the facilities for the device. No search assignments were made.

The search had been localized by the investigator as being in or around the computer facility, in the manner of a telephone call which might have been received from a perpetrator. Among the non-DP personnel present, there seemed to be general confusion as to what they should do. Some communication was passed to areas under their supervision, but generally those people merely took part in the search — with no concept of what they were looking for, the areas in which they should look for it or how to go about it. Their interest was admirable, but the following things were observed:

- Rumor ran rampant through the facility.
- People had no concept of how to open cabinets to look inside them.
- Cabinets that could be searched were searched several times by various people.
- There was no organization to the search, either on the part of the DP people or non-DP people.

Search Narrows

At this point, the search was localized a second time by the investigator. He declared data entry, user areas and the tape library free areas, and further ruled out the necessity for above-the-ceiling and beneath-the-floor searches. This may well be a luxury not permitted by the perpetrators of such an incident.

When half the alloted time had been used up, or the point at which the facility should have been evacuated, the investigator terminated the exercise and located the parcel for the searchers. It should be noted that it was subsequently determined that at least two people had searched in the cabinet where the parcel was located, in the back of a wide-open cabinet. The meeting was reconvened in the conference room.

In the subsequent meeting someone pointed out that the investigator could easily place the parcel since he had easy access to the facilities. But the investigator contended the parcel was placed in a cabinet approximately three feet from the computer's CPU, a distance roughly equal to the distance between the CPU and the outside wall of the computer facility (on the assembling side) where the "bomb" could have been planted by a perpetrator without access to the computer facility itself.

Is such an incident possible? The preponderance of evidence suggests it is. The facility has had some bomb scares. How valid are bomb scares and bombing incidents nowadays? Merely four days after the inspection, 10 incendiary bombs were placed in various department stores in a nearby city. Admittedly these were planted by a group of militants during a convention. Not relevant? Perhaps. Suppose such a group chose to demonstrate its demands in an action against this company?

On the day following the simulated incident there was, among facility personnel, keen interest as to when the planting of the package had taken place — in other words, "Whose fault was it?" Fault is not at all the question. Clearly, everyone was at fault. There was ample opportunity for the investigator to place the package in any place at any time on any shift.

It should be noted that some of the managers had little understanding of what was important to remove in time of crisis. One person, for instance, in a later discussion with the investigator, indicated she had no idea what records should be removed should a real incident occur. The woman who handles payroll indicated she did know what documents to remove, but observation of those documents gave no indication of their importance in order to permit someone else to evacuate the "books of record," should she not be available.

(Continued on Page S/13)

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Wide Range of Storage Capabilities Available

(Continued from Page S/10)

10th groove and play it. Now just consider a stack of 10 records bolted together with perhaps an inch of space between the records. You put this package on an unusual looking record player with 9 tone arms and two needles (top and bottom) on each tone arm. This player can play all records simultaneously. That is a picture of what looks and functions like a disk pack and a disk drive.

These disk packs spin as fast as 3,700 rev/min while the heads fly across the disk without actually touching it to locate a precise spot on any one disk and read the information.

Disks can store tremendous amounts of information. Disk cartridges store from 500K bytes to more than 3M bytes, while the largest disk packs can store 300M bytes. A 100M byte pack, for instance, can store the names and addresses of the entire population of Switzerland. And the disk drive can retrieve an address on that pack in about .03 sec.

The first step in making a disk pack is to coat aluminum disk with an oxide (paint-like) formulation. These disks are then baked to bond the coating to the aluminum and finally polished to remove any irregularities. The coating and polishing operation is a very sophisticated and usually highly guarded secret of each manufacturer, for it is here that the recording capabilities of the disks are determined.

Finished disks are assembled into various disk pack models, which are further tested or otherwise prepared for use in a computer system. Disks are very sensitive and require a clean and air conditioned environment. Because the read/write heads fly over the fast spinning disks on an air cushion much smaller than the diameter of a human hair, a particle of dust or some other contamination can abruptly end that flight in a crash onto the disk surfaces and in the process destroy a lot of stored information.

There are many kinds of disk models. Disk cartridges, for example, come as "front loaders" and "top loaders" which of course refers to how they are "loaded" into the computer.

Disk packs also come in many models that are referred to by names like "11 High" and "12 High" (refers to the number of disk in the stack) or 3330s and Trident (refers to the name or model number of the drives that the pack fits on.)

Data modules are a special kind of disk pack which have the heads built right into them. Data modules are expensive, but can process the data extremely fast so that they are in fact a rather efficient storage device.

Disk pack prices range from as little as $100 for some cartridges to more than $1,500 for data modules.

Flexible Disks

A product that offers the best feature of tape and disk storage is the floppy disk, also known as a diskette or flexible disk. It is an inexpensive storage medium like tape but provides addressable information storage like a disk.

The floppy disk (the most common version today is recorded on one side only) holds as much information as 2,000 punched cards and can provide information from anywhere on the disk in less than half a second.

The disk, about the size of a 45 RPM record, is cut from a plastic film, much like comptuer tape film, and is placed and sealed into a special PVC jacket. This jacket serves as a loading device and has a liner which continually cleans the disk.

The head (the read/write magnet) moves across the diskette and unlike the "hard" disk, the head actually touches the flexible disk. Consequently, the ability of the media to perform without wearing out (rubbing the coating off the disk) is an important product quality.

There are a number of flexible disk models available. Some of the newest models have achieved greater recording densities by either one or two changes to the standard floppy disk: one model doubles the data stored on one side by writing twice as much information per track (referred to as a double-density model) or by using both sides of the disk a new model is doubling the data that can be stored on each diskette (referred to as a double-sided diskette).

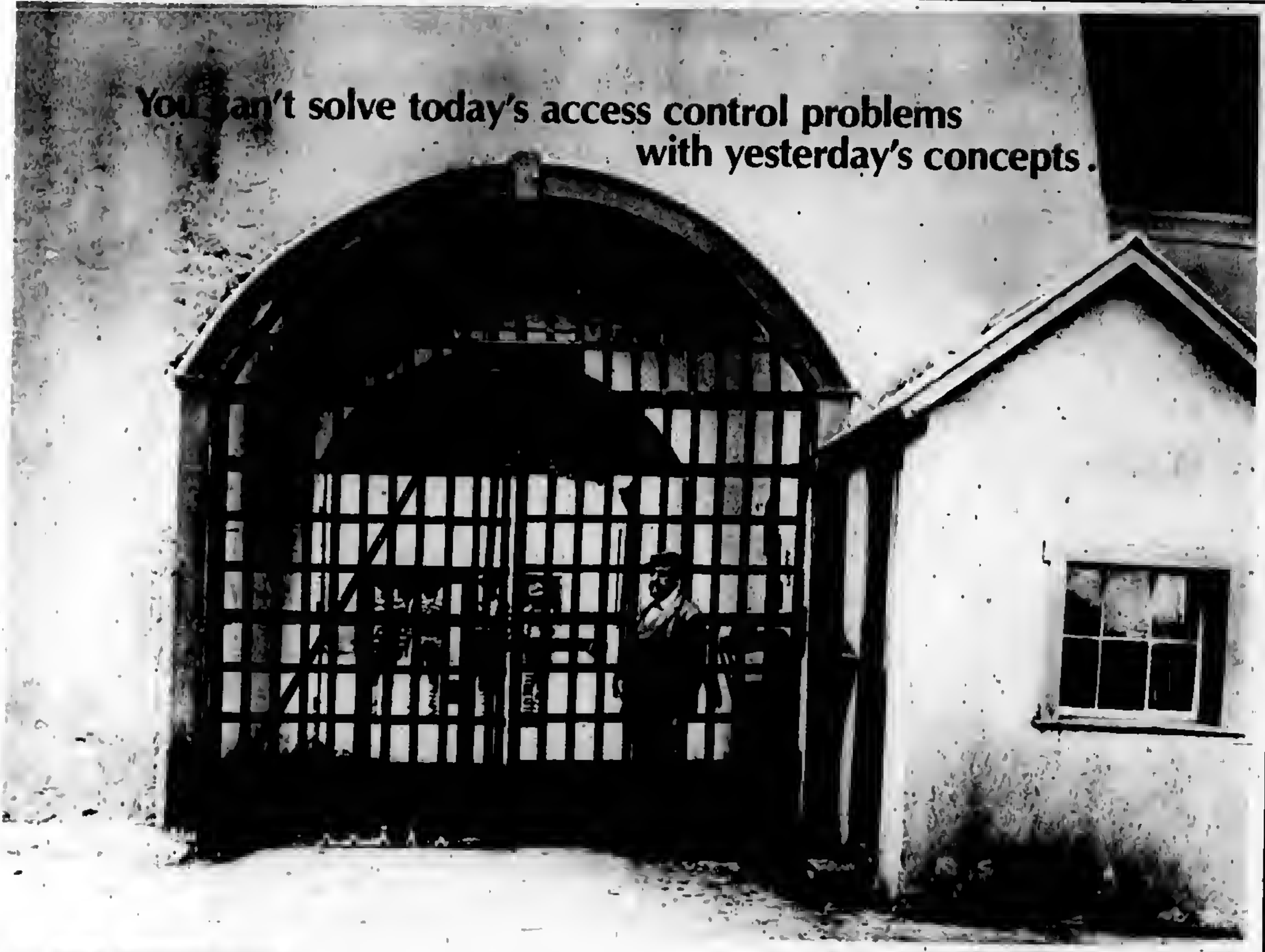
There has also been something called a "flippy" floppy. It can be used on both sides, but the user actually pulls the diskette out of the drive, turns it over and puts it back, whereas a regular double-sided diskette is written/-read on both sides by the drive and does not need to be removed and turned over. This is like playing both sides of a record without having to flip it.

Future models will allow double the data on each side of the disk and will use both sides — in essence quadrupling the available storage capacity.

Prices for the floppy disks fall into the $5 to $8 range. Double-sided, double-density and mini diskettes cost slightly more.

Magnetic media products are like people. They are not always perfect and need special care. They only like to function in climate controlled and clean environments. Dirt, dust and rough handling are not welcome. But if properly cared for they can do an incredibly efficient job for a very long time.

Tullman is product manager of Computer and Business Products for BASF Systems.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Instead of Tapes, Disks

Mag Cards, Cassettes Provide Storage Options

By S.H. Tullman
Special to CW

For the user who is looking for an alternative to tapes and disks, digital cassettes and magnetic cards could be the answer.

The Phillips-type digital cassette looks like the very familiar audio cassette for cassette tape players and is used for data entry, data storage, point-of-sale terminals, archival retrieval and power typing applications. The only differences between audio and digital cassettes are in the tape used and in the internal design.

Digital cassettes are loaded with computer tape, not audio tape. And the accuracy and speed demands made on the digital cassette are met by a much more precise tape guide system, pressure pads and a sturdy housing which can always be opened by removing the five-screws.

Besides the regular Phillips-type there are two other kinds of digital cassettes available. One is the 3M Corp. data cartridge — about the size of an 8-track audio cartridge — and the other is the mini digital cassette — simply a miniature version of the Phillips-type cassettes.

Cassette Features

Digital cassettes record information much like a computer tape and can store the same amount of data as 4,000 punched cards. These cassettes are easy to load, easy to mail and quite rugged and costs about $10.

Last but not least is the magnetic card, which is used on IBM's Magnetic Card Standard Typewriter and similar machines. Although the "mag" card is mostly thought of as a "word processing" rather than a "data processing" medium, it is a digital storage medium and manufactured like computer tape. The coated film is slightly thicker than tape and instead of being slit into ribbons, cards are punched from the film.

The most common use of cards is on "automatic" typewriters. Here the card functions like the paper roll in a player piano. The letter instead of the song is recorded by magnetic pulses rather than holes and after the card is put into a slot, the typewriter cranks out a letter or whatever.

The magnetic card is the same size as the popular punched card. But the important difference is that the information is electronically recorded on the mag card, while on the punch card the pattern of punched holes determines the retreivable information. Each card has enough storage capacity to record up to an average two-page business letter. But the actual capacity is dependent upon the design of the machine.

Most cards are sold in file boxes of 25 cards and cost anywhere from $15 to $25 a box.

Tullman is product manager of Computer and Business Products for BASF Systems.

Firm Discovers Security Holes

(Continued from Page S/11)

On the subject of payroll records, it should be remarked that the cabinet in which these records are maintained is anything but secure. While the cabinet may offer some fire resistance, albeit marginal and dependent on the correct functioning of the overhead sprinkling device, the cabinet itself is not secure and its plastic front can be opened with a common jacknife. It was observed by the investigator that there seemed to be in other areas little knowledge of what records to remove or any program of common marking for identification of such records for evacuation.

Some recommendations for improving security include:

- More concentration on security concerns by either the present security officer or other officer designated for the purpose.
- Establishment of rumor control procedures.
- The immediate development of organized searching methods and training of people in those methods.
- The immediate development, in association with the police, of a comprehensive security program.

This article was excerpted from the book The Data Center Disaster Consultant *by Kenniston W. Lord, Jr. and is available from Q.E.D. Information Sciences, Inc., 141 Linden St., Wellesley, Mass. 02181.*

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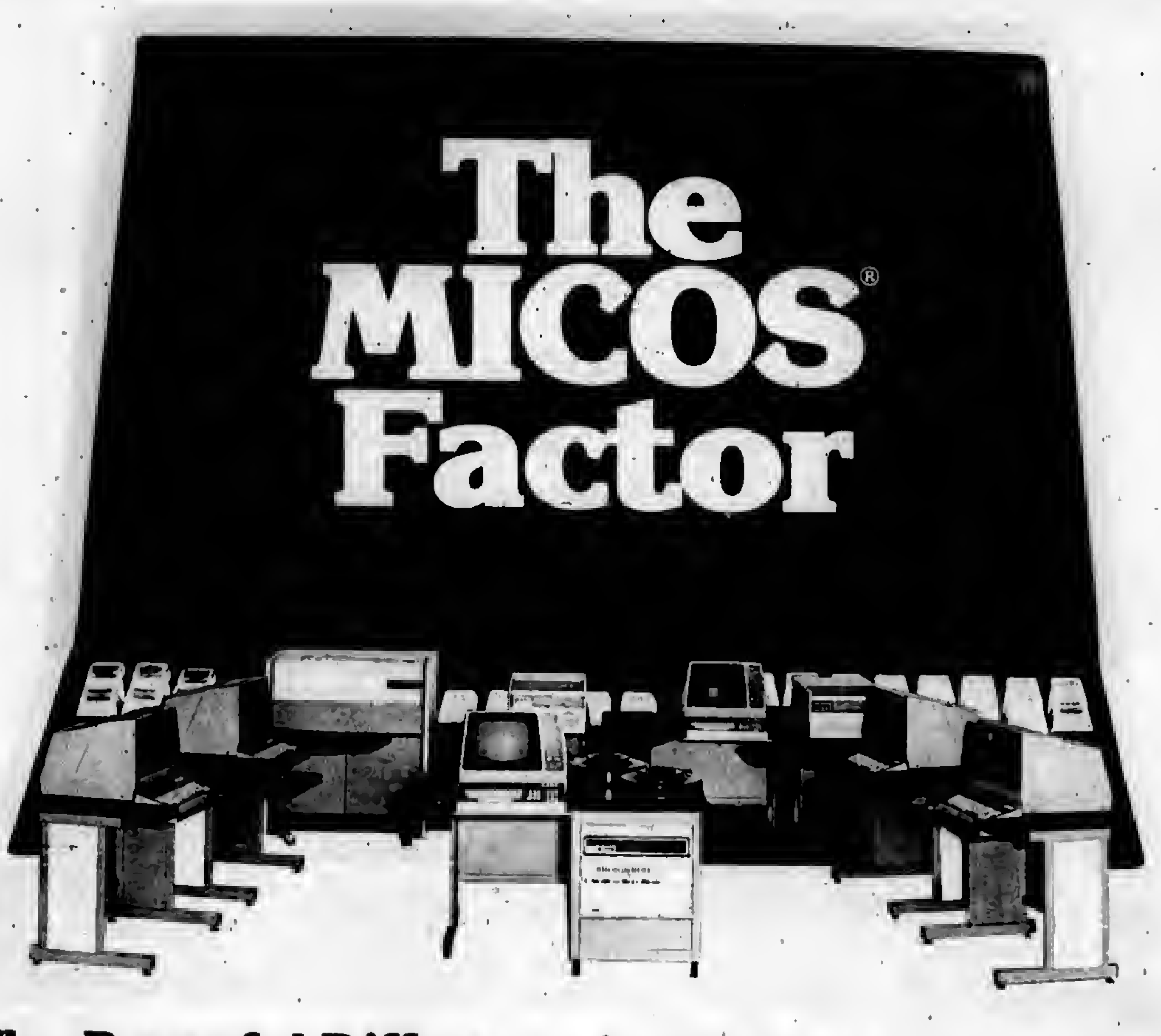

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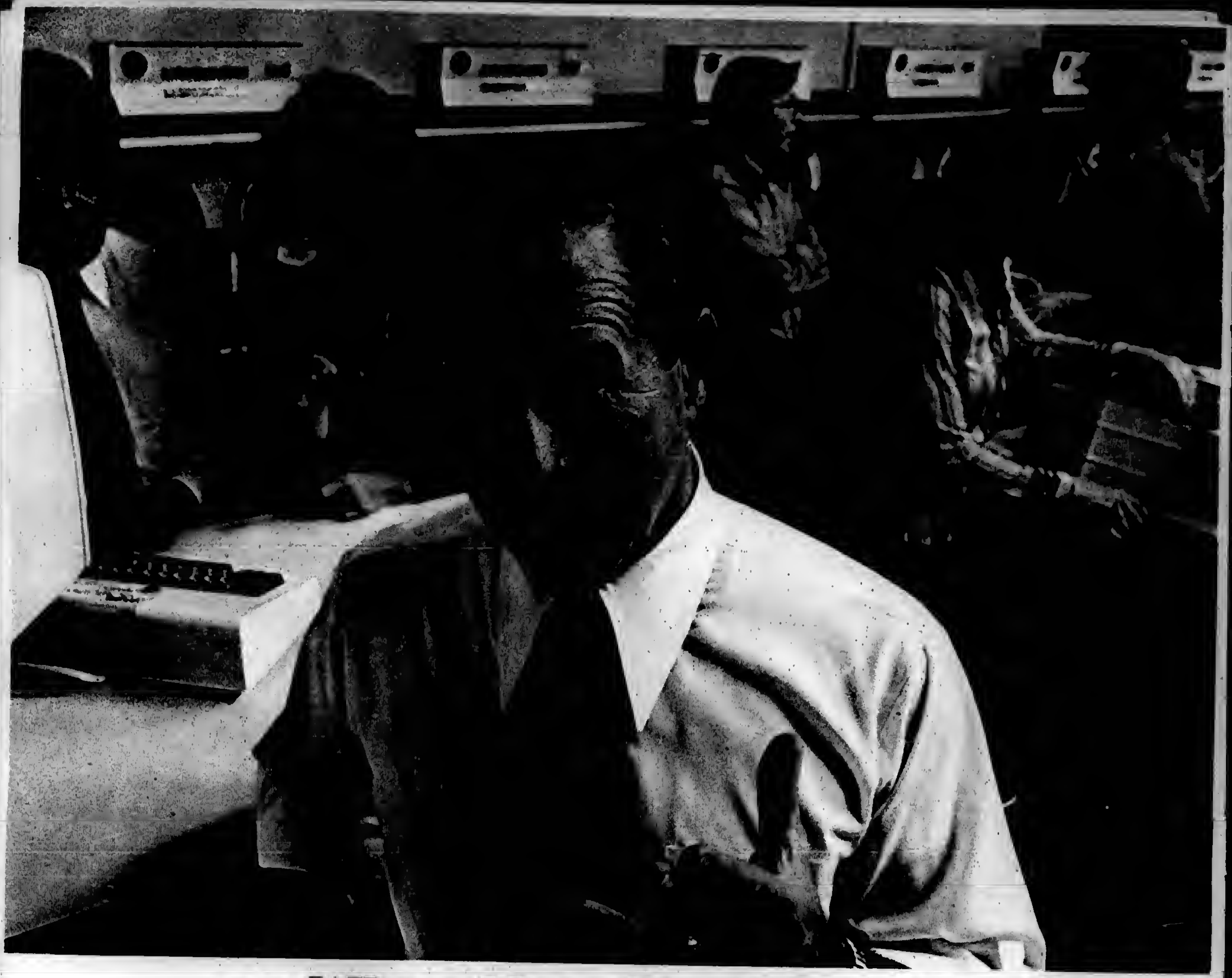

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As 1977 Ends

Users Confront Myriad of Alternatives

By Esther Surden
CW Staff

During 1977, a myriad of product introductions confronted the user and prospective user of both minicomputers and small business systems. Vendors presented numerous alternatives to catch the user's eye, but also succeeded in presenting an increasingly confusing picture.

This year, like many others, witnessed technological progress, but "people-oriented" problems still remained to plague users. Many were dissatisfied with maintenance and software support provided by their manufacturers, citing the traditional problems of software bugs that crash a system, unreliable hardware and poor documentation as major concerns.

For small business system users, the highlight of the year had to be the introduction of IBM's System 34 in April. The 34, IBM's solid entry into the transaction processing, on-line small business system arena, was not to be available to users until January 1978. The mainframer's offering reinforced what small business system users knew all along — they need today's information today.

After the product was introduced, it faced criticism about its limited capabilities and some vendors of small business systems felt secure that their users had a more capable system.

Then, later in the year, IBM increased the storage capacity and number of remote terminals that could be attached to the forthcoming system, correcting some of its major weaknesses and offering users a very strong contender for their consideration.

With the System 34, IBM also followed up on its policy of unbundling, a first move in the very small systems area for the firm, with much of the operating software priced separately. In most small systems, operating software is bundled into the price of the system since without it the system is unusable. Later in the year, NCR Corp. followed suit with its unbundled small systems introduction, the I-8100 series..

Users of the larger IBM 3/15 got increased storage — to 512K bytes — and enhanced communications capability as the mainframer also upgraded this line. In addition, it continued to add capabilities to its Series/1 19-in. rack-mounted mini.

32-Bit-Word Machines

For users of minicomputers, another highlight of the year was Digital Equipment Corp.'s entry into the 32-bit word minicomputer arena, which gave users an upgrade path from its high-end 11/70 and presented more processing power in a minicomputer-sized machine.

Joining other 32-bit-word processors, the VAX-11/780 is a hybrid system with not all data paths 32-bits wide. Signaling a trend toward very powerful superminis with 32-bit words, the DEC VAX system only runs a version of Fortran that takes advantage of the 32-bit architecture. All other languages run in 16-bit emulation mode.

Another vendor provided a system with a 32-bit word this year.

(Continued on Page 30)

DG Ups CS/40 Disk Capacity

WESTBORO, Mass. — Data General Corp. has increased the amount of disk storage available on its CS/40 small business system to 760M bytes with the introduction of two additional models.

The models — CS/40-C4 and CS/40-C6 — can accommodate from one to four 96M- or 190M-byte DG disk storage subsystems. They are also configured with magnetic tape drives for file backup, a spokesman explained.

The two models increase almost 20 times the amount of disk storage accommodated by the CS/40 system, a spokesman claimed. The models are designed for users who need very large file capacities or who must keep a large number of smaller files on-line, he added.

Already-installed CS/40 systems can be upgraded to the C4 and C6 in the field with the addition of an upgrade kit. The kits vary in price, but to upgrade from a C5 without magnetic tape to a C6 with a 96M-byte disk would cost $42,850. The upgrade kit includes all necessary hardware, a magnetic tape subsystem, the disk, an expansion chassis and a two-bay cabinet, the spokesman continued.

With an addition of communications options, the CS/40 models introduced can communicate with other DG or IBM systems, the firm noted.

All models use DG's interactive Cobol language.

A C4 with one 96M-byte disk storage subsystem, four CRTs, one magnetic tape drive and a 300 line/min printer costs $79,060. The C6 with two 190M-byte disk subsystems, magnetic tape, eight CRTs, one 60 char./-sec printer, a 300 line/min printing terminal, remote job entry communications capability and a synchronous line interface costs $138,845. DG is located in Westboro, Mass.

DEC PDP-11/34 Gets Cache Memory Option

MAYNARD, Mass. — A cache memory option will be available soon to users of the Digital Equipment Corp. PDP-11/34 minicomputer, according to the vendor.

Called the KK11-A, the cache memory consists of a 1K-word random-access memory mounted on a single full-width board. The cache reportedly has an 86% hit rate, permitting an increase in processor performance of up to 60% over the 11/34 processors without cache.

The increase in performance brings the high end of the 11/34 into the low end range of the 11/45 and 11/60, the firm admitted.

Users can have their systems upgraded to the option in the field; one board is simply plugged into the backplane of the system. No software changes are necessary to take advantage of the increased performance, a DEC spokesman said.

A high-speed data path used with the system's floating-point processor serves as the interface between the cache and the CPU, DEC explained. The floating-point processor option can be used with cache without degrading the performance of either option, the company claimed.

A processor with factory-installed cache, called the PDP-11/34C, will also be available.

Priced at $3,900, the KK11-A will be ready for installation in June 1978 while the 11/34C, also available in June, costs $18,900. DEC is in Maynard, Mass. 01754.

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Demand for System Flexibility Seen Growing

By Esther Surden
CW Staff

ANAHEIM, Calif. — System reliability and flexibility are buzz words that clearly mean different things to different people.

That much was evident at a recent conference here as several users, vendors and a consultant addressed the topic of reliability and flexibility in future systems.

Flexibility in operations was the main reason New York's Citibank turned to minicomputers, according to Victor Krasan of the institution's Technical Communications Department.

The bank, which has been in the forefront of distributing processing power to users, ultimately wants to reduce DP operations to "one workstation, so that one clerk will handle one customer" and be responsible for all the activities of that customer.

Formerly, Krasan explained, many functions at Citibank were performed in an assembly-line fashion so the chances were that the customer with a problem would never find out which person or step along the way was causing that problem.

Achieving its ultimate goal may be more difficult than the bank originally anticipated, he continued, because although the technology to handle the applications in a single system is available, training an individual to learn all banking processes may be impossible.

At Citibank, reducing paper work has increased the institution's reliability, he indicated.

The Missouri Pacific Railroad Mopac is another large user of minis whose distributed network has attracted much attention.

The railroad is very concerned about equipment reliability because when a system goes down, the operations of a yard can be stopped and it can take a day before operation is back to normal, according to John Brennan of Mopac. Equipment reliability is important because some of the units are put in out-of-the-way places.

"We use receive-only printers in printer shanties," he explained. The printers, located out of the middle of nowhere, print out work orders for work crews. "We usually don't know if they are down until after the work crew has been there," he added.

According to Brennan, Mopac would like to see more diagnostics available so that a malfunctioning printer could send a message back to a minicomputer to alert management that the printer isn't working.

Admitting that the conditions these printers have to withstand are unusual, Brennan pointed out that they should be designed to withstand nonair-conditioned environments and places subject to vibration.

Reliability of Peripherals

Taking the vendor's point of view, Ralph Gabai, corporate vice-president of Pertec Computer Corp., said that systems — and especially peripherals — will have to become more reliable and flexible. Because of the labor-intensive nature of business, downtime will have to be lessened because "we can better afford to have computers waiting for people than people waiting for computers," he said.

With LSI and microprocessor circuitry, manufacturers will have more tools to make peripherals more reliable. Improved reliability can be attributed to the elimination of weak points in a system through the use of fewer connectors, and the peripherals can be programmed to perform error detection and self-correction, he continued.

In disk drives, functions such as error correction and track reassignment will be programmed into the system to compensate for media defects, he predicted.

Systems will also be more flexible, because the host of interfaces available with minicomputers will become one unit, microprogrammable to the various mini specifications. Plug compatibility then will become a "matter of programming within the peripheral," Gabai said.

Representing another vendor, Vernon Smith of Microdata gave the traditional definition of reliability that "the mean time between failure [MTBF] of individual components determines the MTBF of the system."

But that is too simplistic a view for a number of reasons, he indicated. For one thing, the system may not fail each time a component fails and not all failures to perform are the result of hardware component failures. Factors such as noise, marginal components getting ready to fail and power fluctuations can cause failures, he noted.

Users can help improve system reliability by providing a clean environment for their expensive computing sytsems,

(Continued on Page 31)

Users' Alternatives Grow Throughout '77

(Continued from Page 29)

The top-of-the-line superminis from Wang Laboratories, Inc. have the larger word length as well as virtual memory capability.

Top-of-the-line announcements demonstrated a trend toward vendors providing systems into which their users can grow. For example, Prime Computer, Inc. introduced the 500, while Interdata announced the 8/16 to fill out its 16-bit line. Systems Engineering Laboratories added the 32/75 for high-speed computational applications.

Datapoint Corp. came up with the 6600, General Automation, Inc. unveiled its 16/550 dual-processor system and Four-Phase Systems, Inc. unwrapped the IV/90. All of these products seemed to put increasing importance on preserving the user's software investment.

First-time users and those upgrading from accounting machines received a good deal of attention from manufacturers trying to sell their wares. Companies like NCR and Basic/Four Corp. offered systems that users could not program, limiting user options, but also cutting costs. Firms like Qantel Corp. and Basic/Four spoke of parameterized software that could be easily adjusted to a user's needs.

For First-Time Users

First-time users were wooed by an array of equipment so varied that not even the vendors could tell the difference without a scoreboard. Whole minicomputers were contained in single workstations or CRTs and desktop units abounded.

New lines of small business systems were unveiled, such as Univac's BC/7 and Data General Corp.'s CS/40, further adding to the confusion. And almost every small business system that came out was designed not just for first-time users but to fit into remote offices operated by those Fortune 5000 firms as distributed processing continued to become less of a buzzword and more of a reality.

This year showed growth in the mass storage area as well; at least two vendors came out with bulk core storage modules. Described as a replacement for fixed-head disk, the core storage modules presented a different alternative for users with large data base or swapping requirements.

Charge-coupled device (CCD) memories were also made available for end users this year with at least one maker bringing out a CCD-based system that directly interfaced to various popular minicomputers.

Older product lines were also enhanced this year. DEC added three new models to its PDP-8 line and increased memory to 128K. Companies like Texas Instruments took their barebones minis and configured them for commercial users.

Surely not all vendors who followed or initiated trends this year could be named in so short an article, but all of the products introduced this year combine to create a collage of systems suited to almost any user's needs. But if by chance this year's offerings don't fit your requirements, there's always next year. . . .

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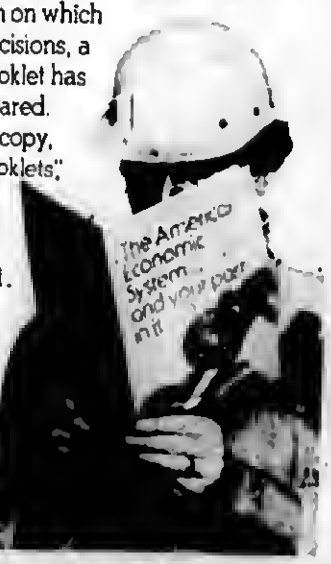
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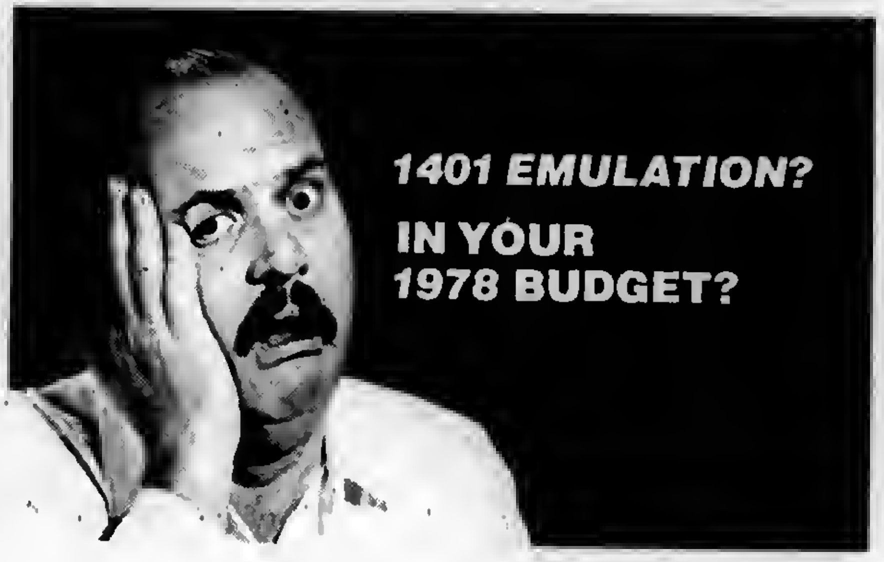
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DDP Seen Easing Department Managers' Jobs

By Esther Surden
CW Staff

ANAHEIM, Calif. — "Distributed processing is a technology that — although very old in theory — is just becoming practical due to advances in hardware technology," Roger E. Billings, president of Billings Computer Corp., told a group at a recent conference here.

Although it is an idea whose time has come, distributed data processing (DDP) is encountering some opposition, he pointed out. Some long-established DPers are well set in the direction that worked for them last year, he explained.

Describing one analysis his company did of a Fortune 500 company that has an IBM 370 mainframe, Billings said many gains can be made with DDP. For one, the management of various departments can have a better knowledge of what goes on in their departments.

In this particular case, the managers of the departments have run their areas "almost as a small business." DDP will help improve that operation, he said.

As part of the analysis, the managers were asked to show the consultants what parts of the printouts prepared by the large system were most valuable to them. The results of this exercise showed that the managers did not understand the printouts and in many cases didn't understand the accounting manipulations that produced the various numbers on the printouts.

Photos by E. Surden
Roger E. Billings

The managers were also asked what numbers they would like to see on the printouts, but the analysts found the information the managers most wanted was already available to them, although not in an easily accessible form. DDP can make information easier to get, he indicated.

To overcome fear of the system, the company let each manager learn how to run a simple conversational program. "They all became excited," he said, at the system's possibilities.

Although the system is not yet implemented at the company, when it is the firm expects several benefits to take place as a result of DDP. "The department managers will find out what's going on in their departments," Billings said.

In addition, the system will probably eliminate 250 employees now employed in either card input functions or not adequately producing for the firm.

Users Told Not to Underestimate Cost of Installing Small Machines

By a CW Staff Writer

ANAHEIM, Calif. — When it comes to costs, putting in a minicomputer is just like putting in a mainframe: "You have to do your homework," John M. Weir, president of Accounting Datamation, Inc. told a session at a recent conference here.

Installation costs are important because they often exceed hardware costs, he cautioned about 200 attendees at a session on the criteria used in selecting and evaluating a minicomputer.

The installation includes the planning and system design phase, the programming of the system to meet the objectives outlined in the planning phase, implementation of the system and both hardware and software maintenance.

One of the most important cost-cutting hints an organization installing a system can follow is to make a plan and stick with it, Weir said. Following a plan requires the involvement of the people in the firm where work habits are to change because of the system, such changes should be anticipated, he said.

The most important change that will take place when the mini is installed will be the increased efficiency of management, he added.

'Pay as You Go'

In order to follow a plan, the organization should be aware of the areas that need to be automated. Some applications may be of marginal value to the business, he told the group.

The best way to make sure a system is cost-justified is to adopt a "pay-as-you-go" program of savings, he said.

Management should be heavily involved in the study of which system to choose and the implementation plan, he noted. All the design work should not be left to others; if management is to make the final decisions, there is "no substitute for you in management of the business to get involved."

System design should be undertaken by the people who know why an application should be performed a certain way. Final responsibility for how an application is run should lie with its user, who should sign off on a description of what work is wanted, he recommended.

Programming of the system can be done by an in-house programmer, software consultant or by the vendor who sold the system. If the user chooses to go to a person outside his organization to write the programs, he should look for someone who is familiar with his business.

The user should go visit an installation, Weir advised. Even if that particular installation is not doing exactly what the user wants to do, "you'll come out of the place with good ideas," Weir said.

Demand for Flexibility Growing

(Continued from Page 30)

he said, and by keeping temperatures steady within given ranges.

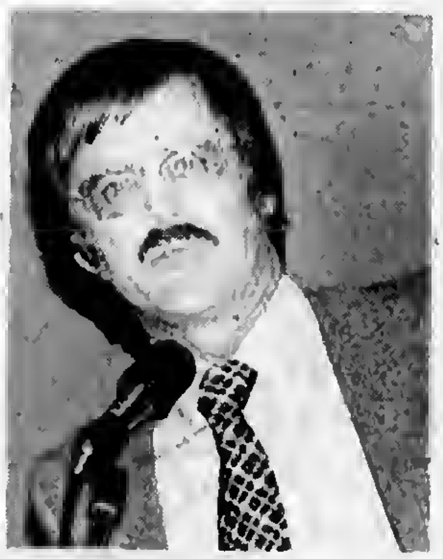
In addition, operators should be trained in handling disks and tapes, he advised.

To an end user, reliability means having access to the system when needed, Smith pointed out, so this requires a system whose data base is protected against loss if system failure should occur. Manufacturers, he noted, must make a trade-off between cost and reliability. If too much reliability is built in, the system can be overpriced while "too little will also get a manufacturer in deep trouble."

It is possible, Smith asserted, to have negligible downtime in the face of a nonnegligible failure.

With tongue in cheek, Thor Thorenson, a consultant with Advanced Computer Techniques, said that flexibility is like rope — the more you have, the easier it is to hang yourself.

Flexibility means a system can accommodate a wide range of user environments and arrangements and the user is free to configure equipment to meet his needs, he continued, noting that for users to be able to configure systems in any way they please, interfacing will have to be standardized.


Thor Thorenson

"To unite manufacturers on this issue will probably be easier than getting a settlement in the Middle East," he continued.

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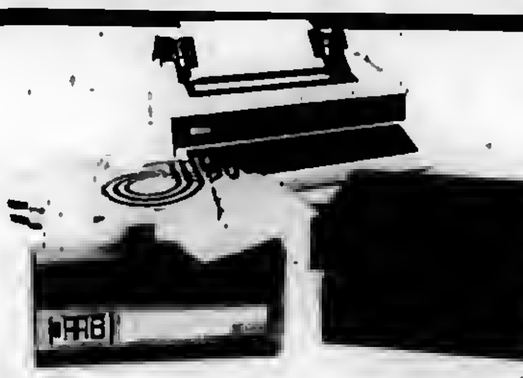

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Rapid Advances Predicted in Mini Storage Area

By Esther Surden
CW Staff

ANAHEIM, Calif. — A tape drive with 15,000 bit/in. density and vacuum buffering, auto-loaded with speeds up to 250 in./sec; floppies interfaced for under $500; nonremovable 300M- to 500M-byte drives at prices 30% less than today's removable 100M-byte drives; and bubble memory emulators of 10M-byte drives — all are in store for users, according to a paper presented at a recent conference here.

Randy Knapp, president of Western Peripherals, Inc. maintained that "one has only to glance through IBM's or Univac's or Burroughs' latest catalog to see what's coming for the mini/micro field."

Magnetic tape is still around despite its predicted demise in the early 1970s, he said. "Its low media cost and almost universally accepted formats leading to informational interchange between all mainframes" have allowed it to hold its own, he indicated.

During the past year, about three different manufacturers introduced 6250 rack-mountable drives and several also introduced 125 in./sec drives "of the more common 1,600/800 bit/in. type," he said. Another innovation was a 45 in./sec tension arm drive, while still another development was the redesign of low-speed 7-in. and 8-in. units by another manufacturer.

Users are attracted to mag tape because a 2,400-ft roll of tape can hold from 20M bytes to 40M bytes of storage for less than $20, he pointed out.

In addition, a local IBM, CDC Burroughs or Honeywell service bureau can read the tapes. Tape also takes up about a third of the space of a cartridge disk and "tape heads don't crash," he said.

"I think mag tape is here to stay for at least the next 10 years, although its place in the market will continue to grow at a decreasing rate." The tape people, he predicted, will still have "a few aces up their sleeves" such as speeds to 250 in./sec and densities of up to 15,000 bit/in.

Floppies' Future

Whether or not floppies will continue to be "the darlings of the industry" will depend on who buys microcomputers. The picture of microcomputers and floppies being "catapulted" into homes of the future may or may not come true, he indicated.

The area of head-per-track units has stayed stable with "one exception" — bulk core memory emulators of disk systems. This application could be extended to bubble memories, he said.

Cartridge disks are showing a "slow shift upwards in density" to 4,400 bit/in. and are now available with 40M bytes of storage.

Tektronix 4051 Has File Manager

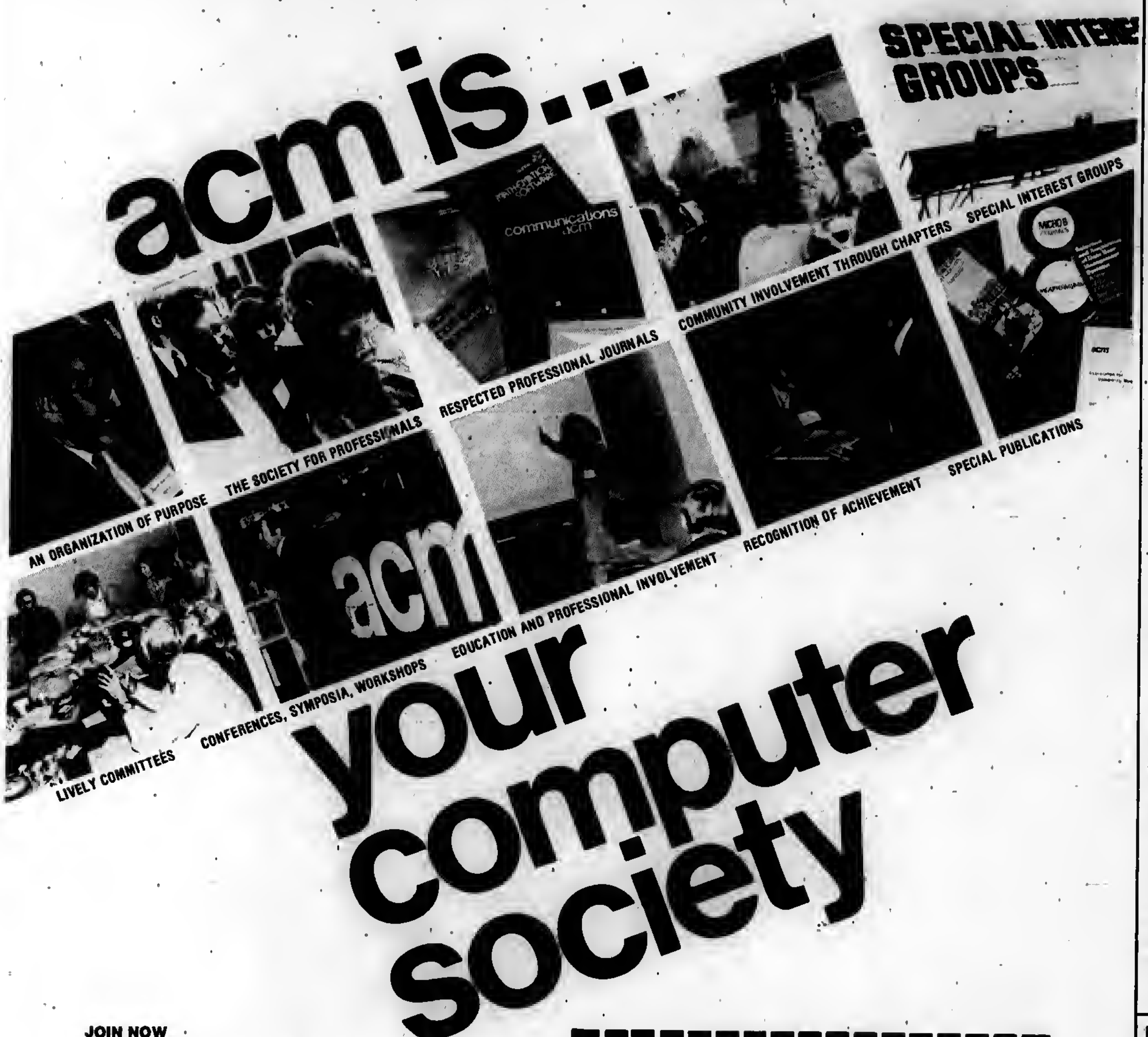
BEAVERTON, Ore. — Tektronix, Inc. has a flexible-disk, mass-storage device designed to give its 4051 graphic system random-access file management capability.

Using double-density recording, the 4907 file manager provides up to 1.89M bytes of user-available storage in the triple disk drive configuration, the firm said.

Variety of Configurations

The 4907 is available in single, double and triple disk drive configurations. The single disk drive is contained in a single cabinet; a second cabinet is required for the double-or triple-drive configurations, Tektronix added.

Base U.S. price for the single-drive, 630K-byte configuration is $3,900. Tektronix can be reached at P.O. Box 500, Beaverton, Ore. 97077.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Brought to Public in Grand Style

Hobby Micro Comes of Age in 1977

By Frank Vaughan
CW Staff

Someday, historians may look back on 1977 and decide 1977 was the year when the hobby microcomputer came of age. . .

Certainly, the micro saw some use before 1977, but it was never paraded before the public in such a grand style as it was this past year. This was truly the year of the micro show.

The historian who looks back on 1977 will most certainly feel the first of the microcomputing shows took place on the national level, beginning with the First West Coast Computing Faire. Other significant shows during the course of the year took place in Atlantic City, Boston, New York and Chicago.

Wild West Show

As with all emerging ideas, the microcomputing scene seemed like part of a Wild West show during the past year. Foolish claims concerning shows were met with even more foolish rebuttals, and observers from the more "established" areas could only shake their heads and mutter that "they'll get over it ... someday."

One thing about 1977 the historians are certain to note with dismay is that this was not the year of the user. In many cases, it was the year for everyone but the user.

> *" ... this was not the year of the user. In many cases, it was the year for everyone but the user."*

What made it that way? For one thing, the very nature of the industry, with firms introducing nonexistent products, hoping to sell enough of the idea to actually be able to manufacture the product.

Unbelievable lags in delivery times and, in many cases, an unfortunate tendency to ignore user complaints of nondelivery, nonexistent documentation and unobtainable performance claims also contributed to the user's mayhem.

But the hobbyist is still pushing to the front of the booths, checkbook in hand, hoping to buy the ultimate system for the least amount of money. The reasons for this? Certainly the major products that have been announced for the hobbyist this year can be given credit for sparking more and more of the interest in the hobby.

Among the major products making their debut were Radio Shack's TRS-80, Heath Co.'s H-8 and H-11 and Commodore's PET. These products helped change microcomputing's reputation, from being the elite hobby of electronics and ham radio enthusiasts to a hobby which a nontechnical person can enjoy.

The increased interest in microcomputing as a hobby spawned several hundred hobby clubs throughout the country, several boasting membership in the hundreds. The clubs played an important part in the development of microcomputing as a hobby and began to play a role in developing user "clout" with the vendors.

In addition, many of the clubs began subdividing into special interest groups or user groups for each of the major microprocessors, aiding in the develoment of software and diagnostics.

This growing user clout was especially evident in the area of programmable calculators, where users were able to develop capabilities unknown to the manufacturers ... and the vendors responded by coordinating activities with some of the user groups.

What else was 1977? It may have been a lot of different things to a lot of different people, but most of all it was the year when the micro came of age for the user — and the user began to exercise some control over the way the hobby shaped up.

Static Memory Modules Introduced for PCM-12

SAN RAMON, Calif. — Three static memory modules have been introduced by Pacific Cyber/Metrix, Inc. for use with its PCM-12, a 6100 microprocessor-based, 12-bit microcomputer system.

The first, the 12020A, is a 4K-word by 12-bit memory element that constitutes one full field of memory. Each board reportedly carries 59 integrated circuits, of which 48 are low-power, 1K static memory devices, and all the necessary bus interfacing logic.

This unit costs $289 assembled and $199 in kit form.

The 12160 holds 1.5K 12-bit words of read-only memory in the highest pages of its field and, in its lowest pages, 512 12-bit words on n-channel random access memory (RAM).

With a memory extender module, the 12160 can be used in any 4K field of memory in the PCM-12, the vendor said. It costs $455 assembled and $385 in a kit.

The 12210 is a nonvolatile memory organized as 4K, 12-bit words. It is comprised of 48 1K CMOS RAMs with an automatic battery backup that retains the contents of its memory up to 30 days when the system power is turned off, the firm claimed.

The unit also contains all the TTL necessary to interface it with the PCM-12's system bus. This memory module is priced at $580 assembled and $490 in kit form.

Pacific Cyber/Metrix is at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

SC/MP II Gains Development System

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced the Low-Cost Development System (LCDS), intended for use in hardware and software development, for its SC/MP II microprocessor.

The SC/MP and SC/MP II microprocessors are object-code compatible, both having built-in multiprocessor capability.

The firm regards the SC/MP II as a faster, lower power n-channel upgrade of the original p-channel MOS SC/-MP, running twice as fast and requiring less than 200 mW of power.

Existing user hardware can be channeled into the LCDS and programs not exceeeding a certain level of complexity can be entered in hexidecimal and executed from any point in memory, National Semi said.

Instructions, memory data, control values and contents of various registers can be displayed and modified. Programs can be single-instruction stepped, executed at speed or executed in sections broken by dynamically inserted halt instructions, a spokesman added.

The firm is currently working on an SC/MP "In-Circuit Emulator" card and a bipolar programmable read-only memory (Prom) programmer card for the LCDS to be available by the end of the year.

The LCDS is priced at about $500 from National Semi at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Book Details Basic Games

ROCHELLE PARK, N.J. — A collection of games and puzzles that have been written in Basic has been published by the Hayden Book Co.

Game Playing With Basic, written by Donald D. Spencer, contains over 60 computer games and puzzles. The book is written in a nontechnical style, with information on the history and theory behind many of the games, the publisher said.

Program listings, flowcharts and diagrams are also included.

The 166-page book costs $6.95 from Hayden at 50 Essex St., Rochelle Park, N.J. 07662.

Development Units Based on Z-80

LOS ANGELES — Four product development systems that are based on the Zilog, Inc. Z-80 microprocessor unit (MPU) have been announced by Futuredata Computer Corp.

The Microsystem 12, 15, 20 and 30 include an MPU that can accommodate up to 56K with available memory modules. A 960-character CRT, Ascii keyboard, dual floppy disk or cassette tape unit and operating system software and documentation are also included with the systems.

Features include two RS-232 serial ports, an 8-bit parallel TTL I/O port, a real-time clock, a bootstrap in programmable read-only memory, a write protect feature under software control, 8-level vectored interrupts and a direct memory access (DMA) capability, the firm said.

Basic Microsystems include 16K of memory with the exception of the Model 15, which has 32K of random-access memory (RAM).

The Microsystem 15 includes a monitor/debugger and an editor and assembler in memory along with source and code workspace; it is priced at $5,275.

The Microsystem 12, which has a Microtape/2 dual cassette tape unit, costs $4,325. The Microsystem 30 comes with an 8-in. floppy disk unit and costs $7,675; the Microsystem 20, with a 5-in. mini floppy disk drive, sells for $6,475.

Additional RAM modules for the systems start at $475, Futuredata said from 11025 S. La Cienega Blvd., Los Angeles, Calif. 90045.

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C

CORE — Refers to tiny "doughnuts" of magnetizable metal that can be in either an on or off state and can represent either a binary 1 (on) or binary 0 (off). Commonly called magnetic core and used as the basic type of main memory for many computers.

CROM (CONTROL READ-ONLY MEMORY) — Refers to a specific ROM that has been designed and microprogrammed to decode control logic. It is a major component of several types of microprocessors.

CROSS-ASSEMBLER — 1. Refers to a program run on one computer for the purpose of translating instructions for a different computer. 2. Programs are usually assembled by the same assembler or assembly program contained within or used by the processor on which they will be run. Many microprocessor programs, however, are assembled by other computer processors whether they be standard, time-shared, mini or other microcomputers. This process is referred to as cross-assembly, and the programs are not designated for specific microprocessors but are to be used on other computers. They are known as cross-assemblers.

CURSOR — 1. Refers to various position indicators frequently employed in a display on a video terminal to indicate a character to be corrected or a position in which data is to be entered. 2. A solid underscore which may appear under any character location on the screen. In some systems the cursor always appears under the location where the next character will appear.

D

DAISY CHAIN — Some microprocessor manufacturers use bus lines that are interconnected with units in a manner such that the signal passes from one unit to the next in serial fashion: The architecture of the Fairchild F-8 is an example of daisy-chained memory chips. Each chip is designed to connect to its associated unit to accomplish daisy-chaining of interrupt priorities, beginning with the chip closest to the CPU.

DATA — 1. A general term that is used to denote any or all facts, numbers, letters, symbols, etc. which can be processed or produced by a computer. 2. In a more restricted sense, data refers to numerical information as contrasted with nonnumerical information. 3. Implying source data or raw data as contrasted with information which is then defined to mean the knowledge obtained by the processing of data.

DATA BUS — Most microprocessors communicate externally through the use of a data bus. Most are bidirectional, e.g., capable of transferring data to and from the CPU, storage and peripheral devices.

LEARNER'S LEXICON

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Revenues, Earnings Up for Most

Industry Experiences Boom Year in '77

By Molly Upton
CW Staff

For the computer industry, 1977 was a boom year, reminding many industry veterans of the salad days of the late 1960s.

Revenues and earnings were up for most firms and most were predicting that the good times would carry over through at least the first half of 1978.

Everyone in the mainframe business reported profitable results, led, of course, by IBM, which continued to set earnings and revenue records at a methodical pace.

At the lower end of the industry, a trend toward acquisitions which began last year proceeded at a steady pace throughout the year, with a flurry of activity coming in the last quarter.

The services firms continued to cast their nets for smaller fish, and some of those fish were not really so small. ADP fed its ever-voracious appetite with First Data Corp. and several other firms. Itel, too, was on the march.

In other areas, terminal makers of various sorts seemed to be ripe for takeovers. Incoterm, after an ill-fated attempt at a union with Data General Corp., found Honeywell Information Systems to be an acceptable suitor.

Sycor was snapped up by Northern Telecommunications, Inc., which also picked up a piece of Data 100 Corp.

And then there was Shugart — now part of the Xerox conglomerate along with Diablo. Shugart had survived some hard times when the market was slow in developing and the founders had ideas about entering other product areas.

It managed to stake itself to a sizable piece of the floppy disk pie and developed head technology that should enable it to produce for Xerox an entry in the Winchester-type market. Could it have made the bigger time alone?

These were but a very few of the multiplicity of acquisitions that happened in 1977.

Pricing Moves

On the pricing front, mainframers gave the distinct impression they were reluctant to pass cost decreases on to the consumer until the other guy made the first move.

In at least one instance, IBM was the first to make the move, and the others followed suit rather quickly. Although analysts expressed concern about the effects on the others' profit margins, no adverse effect surfaced. Perhaps there was more fat there than met the eye.

But with decreased prices on hardware, the mainframers turned to other areas. Consider, for example, the pricing on maintenance and software.

In the mini arena, Control Data Corp. continued to be very competitive with its OEM peripherals.

As happened last year, printers continued to be a field with allure, and many firms unveiled slow, medium and fast printers at the National Computer Conference in Dallas.

It had been five years since there were semiannual industrywide conferences sponsored by the American Federation of Information Processing Societies. Dallas was full to overflowing, and the 1978 show at Anaheim is not only sold out for the convention center, but also for a parking garage, which will be enclosed for the occasion. Time for two a year?

Micros, which have certainly been around on the OEM scene, emerged this year as a consumer market that more than a few began investigating.

And then there were the minis. As before, the lines between mainframe and mini and mini and micro continued to blur to the point where one wondered if the different monikers served any useful distinction.

The mini makers decided 32-bit machines weren't strictly for the scientific crowd, and the bets are on the table for which firm will effectively market a true 32-bit architecture and software designed specifically for business data processing.

F&S Sees Product Mix Changing As Communications Grows 20%

NEW YORK — While the data communications marketplace will show substantial growth over the next five years, that growth will be marked by a great deal of change in the product mix, a Frost and Sullivan, Inc. (F&S) report indicated.

The market will grow at a rate of over 20%, the market research firm said, adding, however, that "in the early '80s we expect this market to be subject to major redefinition."

Depending on that redefinition of the market, it could either grow rapidly or shrink from that point on, the firm said.

What will happen is that "data communications, and for that matter DP itself, will gradually become less of a highly specialized, sterile technical discipline, but more of a commonly accepted facet in our daily life," F&S said.

Looking at specific product areas, the report predicted "the modem market in general will remain stable with very moderate growth. But the various modem types will fare differently in the years ahead.

"Low-speed modems will lose ground to high-speed modems as technological advances permit higher speed transmission using the voice grade line, but both categories, together with medium-speed modems in between, will suffer from the increasing market share for digital transmission facilities that do not require modems."

The multiplexer market, however, "will be more interesting. While the future of the multiplexing function is not altogether bright (the function could be taken over by common carriers), multiplexers now tend to become more sophisticated and to encompass certain functions heretofore fulfilled by communications processors.

"By the same token, some limited multiplexing chores are being fulfilled by modems," the report said.

"The market for communications processors will remain a major segment of the data communications market and will continue to grow, but will be subject to redefinition. It may even be redefined away altogether," F&S said.

"Assuming we will still have a 'communications processors' product category in the mid-'80s, we predict minicomputers will take a greater role, and packaged communications processors will become more of a peripheral for the mainframe. IBM will remain in control over this market.

"It is possible that much of the communications processing functions will be either made a standard feature of the mainframe or taken over by common carriers," the report added.

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SEL Sees Established Areas Its Major Strength

By Molly Upton
CW Staff

FORT LAUDERDALE, Fla. — The upswing in Systems Engineering Laboratories, Inc.'s (SEL) order rate reflects increased demand from the firm's established market areas rather than the recent excitement about 32-bit machines, according to Sam Bosch, director of product marketing.

The firm expects to earn over $4 million while increasing shipments to more than $50 million during the year ending June 30 compared with shipments of $31 million last year, he said.

SEL's principal marketing thrust is to OEMs supplying equipment for simulation, scientific computation, energy management and data acquisition, he said. The firm also intends to focus on improving productivity, he added.

Although the government was once SEL's predominant customer, sales to the government now account for 50% of the firm's business.

"Simulation has caught the fancy of people for no matter how expensive a simulation system, it is cheaper than" testing to destruction, Bosch observed.

SEL machines are used to simulate power plant operations, and space shuttle and aircraft flights, for example, he said.

The value of the average SEL unit is more than $120,000, he said. SEL provides Its OEMs with systems level capabilities such as CPU, memory, disk, tapes and peripheral controllers.

Software includes Fortran IV, a real-time monitor, program development executive and terminal support subsystem, he explained.

The firm plans to offer some capabilities for multiuser functions, but is not chasing the general business DP market, he added.

Demand for 32-Bit Machines

One reason for the rise in demand for 32-bit minis is the decreasing difference in price between them and 16-bit machines, he indicated. The cost differential once was 50% to 100% more but is now between 10% and 20%. None of the major vendors got into the 32-bit field as they were booming with 16 bits, he added.

Commenting on Digital Equipment Corp.'s entry into the field, he said, "I'm not really tickled pink. In the long term we'll be competing with them, but for a couple of years they'll protect their 16-bit base and also will be selling to their current base."

SEL has the fastest I/O bus on the market — 26M byte/sec vs. DEC's 13M byte/sec, he added.

The firm has increased its production rate from four CPUs per week to eight and plans to be turning out 10 per week by June, he said.

Whereas a year and a half ago the firm had about 500 employees, it now has over 900, he said. SEL runs a second shift and next year will obtain 40,000 sq ft of office space so it can increase its production area. Currently the firm has around 150,000 sq ft.

In addition, the firm is "investigating the addition of a facility in Puerto Rico."

SEL has offices in 18 cities in the U.S. and 12 international sites through subsidiaries.

At the firm's annual meeting, President Asa Randolph unveiled the $40 millon projection but observed that as of the end of October, the firm's backlog was $34.5 million of which $32 million worth — 132 computers — must be shipped by June.

SEL was quoting delivery times of 150 to 180 days and is attempting to reduce that to 90-120 days.

The first-quarter earnings rose 461% to $875,000 from $156,000 in the same period the previous year on a 63% rise in revenues to $9.8 million from $6 million.

Randolph said the firm is converting from wire wrap technology to etched printed circuits throughout the 32 series line, which should expedite production and improve reliability.

The last big year SEL posted was fiscal 1970, when it showed $1.8 million in earnings on $20 million in revenues.

Canadian Firm Acquires Sycor, 12% of Data 100

MONTREAL — Northern Telecom Ltd. here went on a buying spree south of the border, agreeing recently to purchase Sycor, Inc. and pick up a 12% interest in Data 100 Corp.

Northern, with revenues of $1.1 billion (Canadian) in 1976, is the largest manufacturer of communications equipment in Canada and second only to Bell in North America.

Under the deal with Sycor, the firm would pick up all the Sycor stock at a rate of .9 share of Northern for each Sycor share with a minimum value of $22 per Sycor share. The agreement must be approved by Sycor shareholders and the boards of each firm.

The 12% purchase of Data 100 stock is part of an agreement between the two firms that will permit Northern to eventually purchase up to 35% of Data 100. The price for the one million shares of Data 100 stock was set at $15 per share; Northern has the option to pick up another one million shares by the end of 1978.

In addition, Northern will invest $5 million in a joint research and development effort with Data 100, the firms said.

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Aggressive Program Planned

Varian Gives Univac New Market

By Esther Surden
CW Staff

IRVINE, Calif. — When Univac acquired Varian Data Machines last spring, it continued the trend of mainframers moving into the lucrative minicomputer business.

Joining IBM and Honeywell, which now manufacture their own mini systems, Univac acquired the company to "attack a market it was not in before." This market consists of users who need systems that fall beneath the firm's BC/7 small business system and its somewhat larger 90 series, according to Jerome J. Meyer, vice-president and general manager of Univac Minicomputer operations.

The move to minis has given the firm the ability "to capture those buyers who normally buy products out of that sector," he explained, as well as the opportunity to protect the low end of the Univac line from erosion by other vendors.

Is Univac going to stay in the mini business? "Our strategy is not to buy out our competition," Meyer answered.

Although the division is still in a state of transition, ambitious plans to beef up operations are already under way. Estimating the minicomputer industry's growth rate at 40% per year, Meyer said "we have to beat that growth."

Univac will continue to serve the two market areas already developed by the Varian organization. As Meyer explained, the Varian systems were used by scientific users in high technology industries or incorporated into specialized systems such as numerical control units. Just prior to the Univac takeover, the firm had taken a step into the commercial end-user marketplace.

"We are trying to get a balance" between the scientific and commercial marketplace, he said.

Announcements Planned

Univac plans an aggressive program in product announcements over the next year. New products will be coming out at a fairly frequent rate, Meyer said.

Hinting that at least some of these announcements will be products designed to work with larger Univac systems in distributed data processing applications, Meyer added the firm also "has a lot of people looking at the embedded mini" that is, using the systems as componenets.

Univac, having acquired a mini manufacturer, "intends to exploit it to the maximum."

When Univac took over Varian, "we kept it intact except for two areas," Meyer continued. The small Varian operation in Europe was moved to Univac International, and the customer engineers were moved into the larger Univac customer engineering group.

Cross-Training Underway

All customer engineers are in the process of being cross-trained on all the equipment, he said. Before, "there were cities where Varian just couldn't make a sale" because service was so far away, he stated.

Presently the hottest selling item in the Univac product line is its V600 system, "but that may be because that's what we are asking our people to sell," Meyer noted.

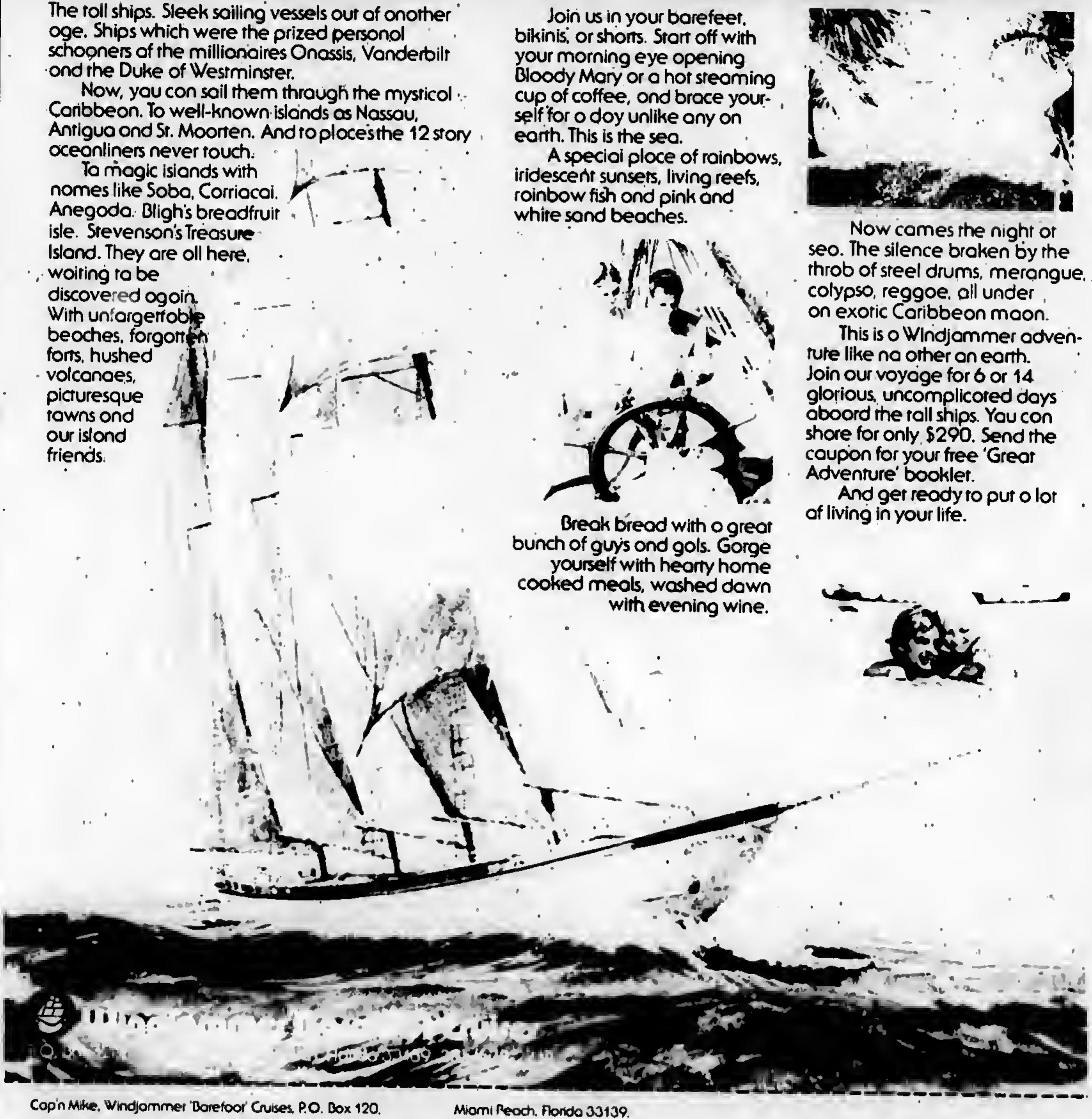
Minis for Lease?

Although there is a dedicated sales force for the minicomputer product line, the system is also available through the regular Univac catalog. The Minicomputer Operations Division is also eyeing the possibility of leasing the minicomputer equipment.

Part of the reason no such plan has been released is that the firm expects an upsurge in business when the minis are available on lease, he indicated. This might tax the company's present capacity, he noted, since it has not achieved the industry-standard 90-day delivery rate for its systems. It is working on the problem, he said.

CW Photo by E. Surden

Jerome J. Meyer



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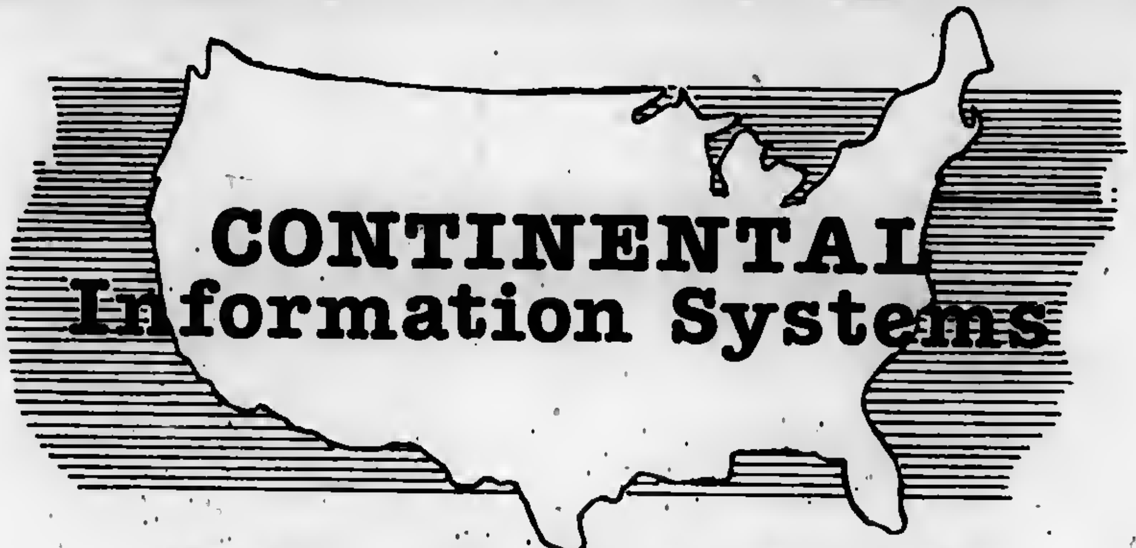

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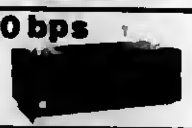
2400 bps 	**MODEM 3300/24** 2/4 wire dedicated line operation with built-in test pattern generator.	$995 $35/mo.*	**$595** **$24/mo.***
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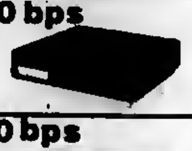
4800 bps 	**MODEM 4400/48** Manually equalized for dedicated unconditioned lines.	$4800 $135/mo.*	**$995** **$40/mo.***
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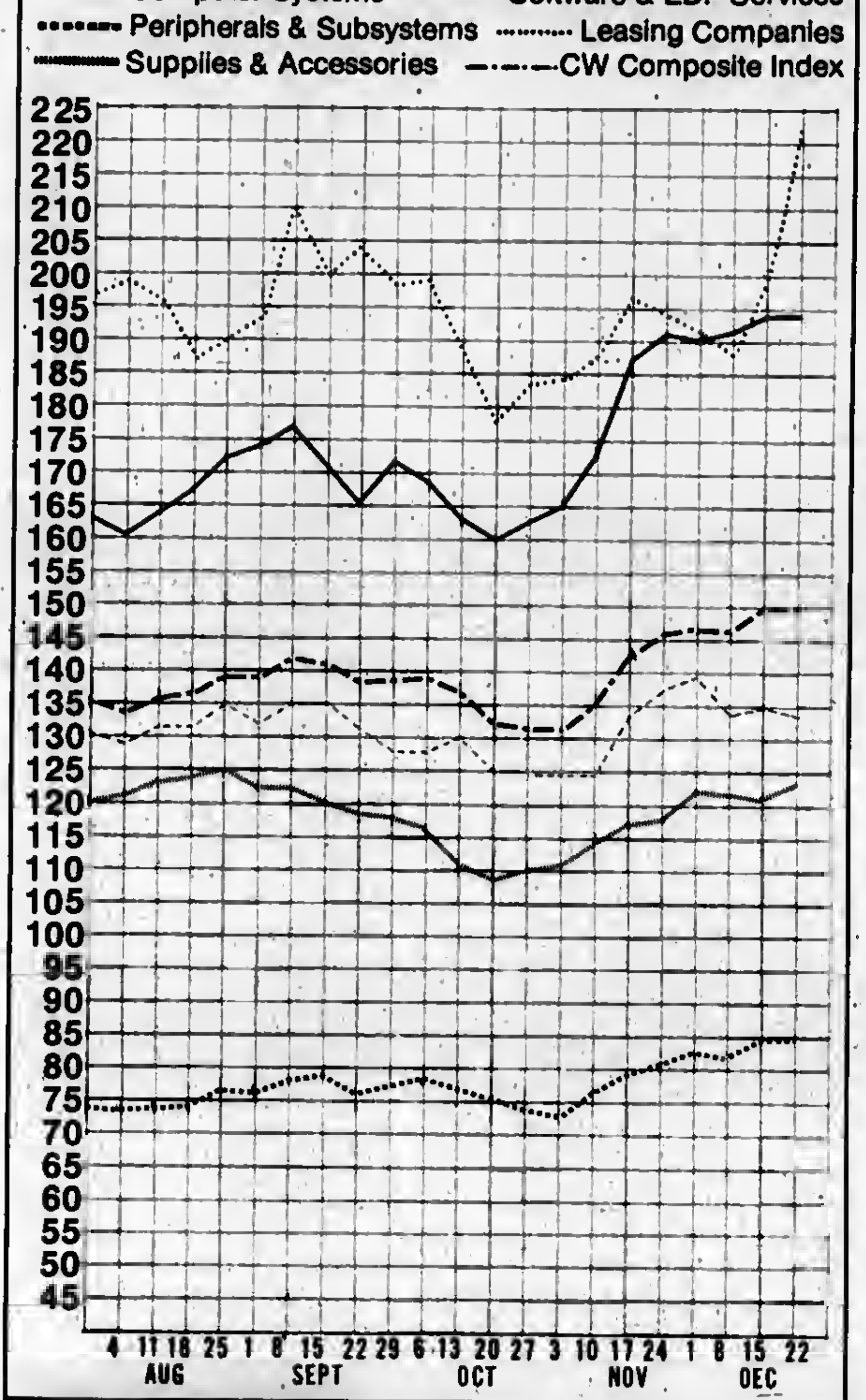

Earnings Reports

COMPUTER COMMUNICATIONS
Three Months Ended Sept. 30

	1077	1978
Shr Ernd	$.14	$.13
Revenue	3,506,431	3,068,254
Tax Cred	200,000	180,000
Earnings	414,284	372,575

COMPUTER CONSOLES
Nine Months Ended Sept. 30

	1977	1978
Shr Ernd	$.30	e.....
Revenue	11,972,830	$8,475,584
Spec Cred	01,500	.....
Earnings	544,872	19,326

e-No share earnings are shown as preferred dividend requirements exceeded net income.

COMPUTER INSTRUMENTS
Nine Months Ended Oct. 7

	1977	a1976
bRevenue	$1,059,741	$728,718
Disc Op Loss	.....	305,794
Loss	127,878	464,030

a-Restated to reflect discontinued operations.
b-From continuing operations.

DATA SYSTEMS ANALYSTS
Nine Months Ended Sept. 30

	1977	1978
Shr Ernd	$.48	$.25
Revenue	3,480,521	2,614,790
Earnings	316,059	196,612

DIGI-LOG SYSTEMS
Year Ended Sept. 30

	1977	1978
Shr Ernd	$.92	$.51
Revenue	4,054,894	2,503,951
Earnings	634,100	344,032

GREYHOUND COMPUTER
Three Months Ended Sept. 30

	1977	1978
Revenue	$11,880,000	$11,580,000
Disc Op Loss	.....	1,530,000
aEarnings	1,238,000	(789,000)
9 Mo Rev	33,514,000	34,591,000
Disc Op Loss	2,856,000	1,777,000
Earnings	736,000	106,000

a-Earnings per share are not reported because all of the company's outstanding common stock is owned by Greyhound Corp.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 21, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 51	49 1/4	-1 1/8	-2.2
N	BURROUGHS CORP	55- 91	69	- 1/4	-0.3
O	COMPUTER AUTOMATION	18- 30	25 3/4	-1 1/4	-4.6
N	CONTROL DATA CORP	20- 27	26 5/8	- 3/8	-1.3
C	CRAY RESEARCH INC	15- 30	28 3/4	+ 1/4	+0.8
N	DATA GENERAL CORP	35- 54	47 5/8	-1	-2.0
N	DATAPOINT CORP	18- 41	39 1/4	+ 1/8	+0.3
N	DIGITAL EQUIPMENT	37- 53	45 1/2	+ 5/8	+1.3
N	ELECTRONIC ASSOC.	2- 3	2 3/8	- 1/4	-9.5
A	ELECTRONIC ENGINEER.	8- 13	11 3/4	-1 1/8	-8.7
O	FOUR-PHASE SYSTEMS	13- 21	20 1/4	- 1/8	-0.6
N	FOXBORO	41- 54	47 7/8	- 1/2	-1.0
O	GENERAL AUTOMATION	6- 9	7 1/4	+ 3/4	+11.5
O	GRI COMPUTER CORP	1- 1	3/4	+ 1/4	+50.0
N	HEWLETT-PACKARD CO	69- 87	72	+ 1/4	+0.3
N	HONEYWELL INC	43- 55	45 1/4	0	0.0
N	IBM	245-286	266	- 1/4	0.0
O	MANAGEMENT ASSIST	5- 10	9 1/4	- 3/4	-7.5
O	MICRODATA CORP	7- 18	11	- 1/4	-2.2
C	MODULAR COMPUTER SYS	5- 9	8 5/8	- 1/8	-1.4
N	NCR	32- 47	39	- 1/2	-1.2
C	PRIME COMPUTER INC	12- 23	22 1/4	- 3/4	-3.2
N	PERKIN-ELMER	17- 22	19 3/4	- 3/8	-1.8
N	RAYTHEON CO	16- 35	32 3/8	-1	-2.9
N	SPERRY RAND	30- 42	34 3/4	0	0.0
C	SYCOR INC	8- 20	19 3/8	- 5/8	-3.1
A	SYSTEMS ENG. LABS	5- 11	10 7/8	- 3/8	-3.3
A	WANG LABS.	10- 14	12 1/4	- 1/2	-3.9

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 5	4 1/2	0	0.0
C	BOOTHE COURIER CORP	8- 13	13 1/2	-2	-12.9
C	COMDISCO INC	10- 15	14 1/2	0	0.0
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	3/4	0	0.0
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 3	2 3/4	+ 1/8	+4.7
N	DPF INC	6- 10	8 3/4	+ 1/8	+1.4
N	ITEL	13- 22	19 1/2	- 3/8	-1.8
N	LEASCO CORP	19- 27	24	+ 1/4	+1.0
O	LEASPAC CORP	1- 2	1 1/2	+ 5/8	+11.4
C	NRG INC	1- 1	1/4	+ 1/8	+100.0
A	PIONEER TEX CORP	5- 11	5 5/8	+ 1/8	+2.2
N	U.S. LEASING	10- 16	13 3/4	- 1/8	-0.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 7/8	- 1/8	-1.3
A	APPLIED DATA RES.	5- 10	8 5/8	- 1/8	-1.4
N	AUTOMATIC DATA PROC	23- 20	28 3/4	- 3/8	-1.2
O	COLEMAN AMERICAN COS	2- 2	1 3/4	+ 1/8	+7.6
O	COMPU-SERV NETWORK.	9- 15	11 3/4	+ 1/2	+4.4
O	COMP ELECTION SYSTMS	6- 10	9 1/4	+ 1/4	+2.1
O	COMPUTER HORIZONS	1- 1	1	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/8	- 1/8	-1.2
N	COMPUTER SCIENCES	7- 10	9 5/8	+ 1/3	+1.3
G	COMPUTER TASK GROUP	1- 2	1 5/8	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
C	COMSHARE	5- 8	7 1/4	- 1/4	-3.3
C	DATA DIMENSIONS INC	3- 5	4 1/8	+ 3/8	+10.0
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	15 1/2	+ 1/2	+3.3
O	INSYTE CORP	2- 3	1 1/8	0	0.0
G	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	- 3/8	-9.6
C	KEYDATA CORP	1- 3	1 3/8	0	0.0
A	LOGICON	7- 17	12 5/8	-1 1/8	-8.1
A	MANAGEMENT DATA	1- 2	1	- 1/8	-11.1
A	NATIONAL CSS INC	10- 16	15 1/2	+ 5/8	+4.2
O	NATIONAL DATA CORP	4- 1	7	+ 1/8	+1.8
A	ON LINE SYSTEMS INC	16- 22	19 3/8	- 3/8	-1.8
N	PLANNING RESEARCH	3- 6	4 5/8	+ 1/8	+2.7
O	PROGRAMMING & SYS	1- 1	1/4	- 1/8	-33.3
O	RAPIDATA INC	2- 3	2 3/4	0	0.0
O	REYNOLDS & REYNOLDS	17- 21	20 1/4	+ 1/4	+1.2
D	SCIENTIFIC COMPUTERS	1- 4	4	0	0.0
O	TYMSHARE INC	14- 23	21 5/8	-1 3/8	-5.9
A	URS SYSTEMS	4- 5	4 3/8	- 1/8	-2.7
N	WYLY CORP	1- 2	3/4	-	-7.7

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 16	14 1/8	- 1/4	-1.7
O	ADVANCED MEMORY SYS	7- 9	8 1/8	- 1/8	-1.5
N	AMPEX CORP	8- 11	9 7/8	+ 1/2	+5.3
O	ANDERSON JACOBSON	3- 5	4 3/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	13 7/8	+ 1/2	+3.7
O	BEEHIVE INT'L	5- 12	4 7/8	- 5/8	-11.3
A	BOLT,BERANEK & NEW	7- 9	7 3/8	+ 3/8	+5.3
N	BUNKER-RAMO	8- 13	11 1/8	- 1/8	-1.1
A	CALCOMP	3- 5	2 7/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3 5/8	+ 1/4	+7.4
N	CENTRONICS DATA COMP	19- 30	19	- 1/4	-1.2
C	COGNITRONICS	1- 1	7/8	+	+7.1
O	COMPUTER COMMUN.	5- 8	7 3/8	+ 3/8	+5.3
O	COMPUTER CONSOLES	4- 7	4 1/4	0	0.0
A	COMPUTER EQUIPMENT	2- 4	3 1/2	+ 1/2	+16.6
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	0	0.0
C	COMTEN	5- 13	10 1/2	- 3/8	-3.4
N	CONRAC CORP	19- 28	23 1/8	- 5/8	-2.6
O	DATA ACCESS SYSTEMS	4- 5	3 1/4	+ 1/4	+8.3
O	DATA 100	6- 11	10	- 1/8	-1.2
A	DATA PRODUCTS CORP	9- 19	16 5/8	- 3/8	-2.2
C	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2	+ 1/8	+6.6
O	DECISION DATA COMPUT	2- 3	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	1/2	+ 1/8	+33.3
A	DOCUMATION INC	6- 11	9 7/8	- 1/4	-2.4
O	DATARAM CORP	2- 24	22	-1	-4.3
N	ELECTRONIC M & M	4- 5	4 1/2	+ 1/4	+5.8
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 5/8	0	0.0
N	HAZELTINE CORP	8- 12	10 3/8	- 1/8	-1.1
N	HARRIS CORP	28- 45	44 1/4	-1	-2.2
A	INCOTERM CORP	10- 19	18	0	0.0
O	INFOREX INC	4- 7	6 1/4	- 3/8	-5.6
O	INFORMATION INTL INC	9- 14	9	0	0.0
O	INTEL CORP	38- 57	45	0	0.0
A	LUNDY ELECTRONICS	3- 6	3 1/2	- 1/8	-3.4
O	MSI DATA CORP	6- 15	14 1/8	- 1/8	-0.8
O	MEMOREX	23- 34	30	-1 7/8	-5.8
N	MOHAWK DATA SCI	5- 8	6 1/8	0	0.0
O	PENRIL CORP	2- 5	5 3/4	0	0.0
N	PERTEC CORP	7- 11	10 7/8	- 1/8	-1.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3	- 1/4	-1.6
O	RECOGNITION EQUIP	6- 10	7 3/8	+ 1/4	+3.5
O	SCAN DATA	1- 2	7/8	- 1/8	-12.5
O	STORAGE TECHNOLOGY	10- 21	20 3/8	- 3/8	-1.8
O	T BAR INC	7- 13	12 5/8	+ 1/8	+1.0
D	TALLY CORP.	4- 6	4 1/8	+ 1/8	+3.1
A	TEC INC	7- 10	7 1/4	- 1/8	-1.6
N	TEKTRONIX INC	29- 40	36 5/8	-1 1/4	-3.3
N	TELEX	2- 3	3	0	0.0
O	WILTEK INC	1- 1	3/4	- 3/8	-33.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	1 1/4	+ 1/2	+7.4
D	BALTIMORE BUS FORMS	1- 4	1 7/8	+ 1/8	+7.1
A	BARRY WRIGHT	10- 17	15 7/8	+ 3/4	+4.9
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	18 1/2	-1 1/4	-6.3
N	ENNIS BUS. FORMS	6- 7	1	+ 5/8	+9.8
C	GRAPHIC CONTROLS	13- 18	17	+ 1/2	+3.0
N	3M COMPANY	45- [illegible]	45 7/8	- 1/2	-1.0
D	MOORE CORP LTD	24- 37	27 1/4	+ 1/2	+1.8
N	NASHUA CORP	16- 28	19	- 1/8	-0.6
O	STANDARD REGISTER	18- 25	22	+ 1/4	+1.1
O	TAB PRODUCTS CO	9- 19	9	- 3/4	-7.6
N	UARCO	18- 22	20	- 1/2	-2.4
A	WABASH MAGNETICS	10- 15	12	- 1/4	-2.0
N	WALLACE BUS FORMS	17- 21	20 1/8	0	0.0

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C

CORE — Refers to tiny "doughnuts" of magnetizable metal that can be in either an on or off state and can represent either a binary 1 (on) or binary 0 (off). Commonly called magnetic core and used as the basic type of main memory for many computers.

CROM (CONTROL READ-ONLY MEMORY) — Refers to a specific ROM that has been designed and microprogrammed to decode control logic. It is a major component of several types of microprocessors.

CROSS-ASSEMBLER — 1. Refers to a program run on one computer for the purpose of translating instructions for a different computer. 2. Programs are usually assembled by the same assembler or assembly program contained within or used by the processor on which they will be run. Many microprocessor programs, however, are assembled by other computer processors whether they be standard, time-shared, mini or other microcomputers. This process is referred to as cross-assembly, and the programs are not designated for specific microprocessors but are to be used on other computers. They are known as cross-assemblers.

CURSOR — 1. Refers to various position indicators frequently employed in a display on a video terminal to indicate a character to be corrected or a position in which data is to be entered. 2. A solid underscore which may appear under any character location on the screen. In some systems the cursor always appears under the location where the next character will appear.

D

DAISY CHAIN — Some microprocessor manufacturers use bus lines that are interconnected with units in a manner such that the signal passes from one unit to the next in serial fashion: The architecture of the Fairchild F-8 is an example of daisy-chained memory chips. Each chip is designed to connect to its associated unit to accomplish daisy-chaining of interrupt priorities, beginning with the chip closest to the CPU.

DATA — 1. A general term that is used to denote any or all facts, numbers, letters, symbols, etc. which can be processed or produced by a computer. 2. In a more restricted sense, data refers to numerical information as contrasted with nonnumerical information. 3. Implying source data or raw data as contrasted with information which is then defined to mean the knowledge obtained by the processing of data.

DATA BUS — Most microprocessors communicate externally through the use of a data bus. Most are bidirectional, e.g., capable of transferring data to and from the CPU, storage and peripheral devices.

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Revenues, Earnings Up for Most

Industry Experiences Boom Year in '77

By Molly Upton
CW Staff

For the computer industry, 1977 was a boom year, reminding many industry veterans of the salad days of the late 1960s.

Revenues and earnings were up for most firms and most were predicting that the good times would carry over through at least the first half of 1978.

Everyone in the mainframe business reported profitable results, led, of course, by IBM, which continued to set earnings and revenue records at a methodical pace.

At the lower end of the industry, a trend toward acquisitions which began last year proceeded at a steady pace throughout the year, with a flurry of activity coming in the last quarter.

The services firms continued to cast their nets for smaller fish, and some of those fish were not really so small. ADP fed its ever-voracious appetite with First Data Corp. and several other firms. Itel, too, was on the march.

In other areas, terminal makers of various sorts seemed to be ripe for takeovers. Incoterm, after an ill-fated attempt at a union with Data General Corp., found Honeywell Information Systems to be an acceptable suitor.

Sycor was snapped up by Northern Telecommunications, Inc., which also picked up a piece of Data 100 Corp.

And then there was Shugart — now part of the Xerox conglomerate along with Diablo. Shugart had survived some hard times when the market was slow in developing and the founders had ideas about entering other product areas.

It managed to stake itself to a sizable piece of the floppy disk pie and developed head technology that should enable it to produce for Xerox an entry in the Winchester-type market. Could it have made the bigger time alone?

These were but a very few of the multiplicity of acquisitions that happened in 1977.

Pricing Moves

On the pricing front, mainframers gave the distinct impression they were reluctant to pass cost decreases on to the consumer until the other guy made the first move.

In at least one instance, IBM was the first to make the move, and the others followed suit rather quickly. Although analysts expressed concern about the effects on the others' profit margins, no adverse effect surfaced. Perhaps there was more fat there than met the eye.

But with decreased prices on hardware, the mainframers turned to other areas. Consider, for example, the pricing on maintenance and software.

In the mini arena, Control Data Corp. continued to be very competitive with its OEM peripherals.

As happened last year, printers continued to be a field with allure, and many firms unveiled slow, medium and fast printers at the National Computer Conference in Dallas.

It had been five years since there were semiannual industrywide conferences sponsored by the American Federation of Information Processing Societies. Dallas was full to overflowing, and the 1978 show at Anaheim is not only sold out for the convention center, but also for a parking garage, which will be enclosed for the occasion. Time for two a year?

Micros, which have certainly been around on the OEM scene, emerged this year as a consumer market that more than a few began investigating.

And then there were the minis. As before, the lines between mainframe and mini and mini and micro continued to blur to the point where one wondered if the different monikers served any useful distinction.

The mini makers decided 32-bit machines weren't strictly for the scientific crowd, and the bets are on the table for which firm will effectively market a true 32-bit architecture and software designed specifically for business data processing.

F&S Sees Product Mix Changing As Communications Grows 20%

NEW YORK — While the data communications marketplace will show substantial growth over the next five years, that growth will be marked by a great deal of change in the product mix, a Frost and Sullivan, Inc. (F&S) report indicated.

The market will grow at a rate of over 20%, the market research firm said, adding, however, that "in the early '80s we expect this market to be subject to major redefinition."

Depending on that redefinition of the market, it could either grow rapidly or shrink from that point on, the firm said.

What will happen is that "data communications, and for that matter DP itself, will gradually become less of a highly specialized, sterile technical discipline, but more of a commonly accepted facet in our daily life," F&S said.

Looking at specific product areas, the report predicted "the modem market in general will remain stable with very moderate growth. But the various modem types will fare differently in the years ahead.

"Low-speed modems will lose ground to high-speed modems as technological advances permit higher speed transmission using the voice grade line, but both categories, together with medium-speed modems in between, will suffer from the increasing market share for digital transmission facilities that do not require modems."

The multiplexer market, however, "will be more interesting. While the future of the multiplexing function is not altogether bright (the function could be taken over by common carriers), multiplexers now tend to become more sophisticated and to encompass certain functions heretofore fulfilled by communications processors.

"By the same token, some limited multiplexing chores are being fulfilled by modems," the report said.

"The market for communications processors will remain a major segment of the data communications market and will continue to grow, but will be subject to redefinition. It may even be redefined away altogether," F&S said.

"Assuming we will still have a 'communications processors' product category in the mid-'80s, we predict minicomputers will take a greater role, and packaged communications processors will become more of a peripheral for the mainframe. IBM will remain in control over this market.

"It is possible that much of the communications processing functions will be either made a standard feature of the mainframe or taken over by common carriers," the report added.

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SEL Sees Established Areas Its Major Strength

By Molly Upton
CW Staff

FORT LAUDERDALE, Fla. — The upswing in Systems Engineering Laboratories, Inc.'s (SEL) order rate reflects increased demand from the firm's established market areas rather than the recent excitement about 32-bit machines, according to Sam Bosch, director of product marketing.

The firm expects to earn over $4 million while increasing shipments to more than $50 million during the year ending June 30 compared with shipments of $31 million last year, he said.

SEL's principal marketing thrust is to OEMs supplying equipment for simulation, scientific computation, energy management and data acquisition, he said. The firm also intends to focus on improving productivity, he added.

Although the government was once SEL's predominant customer, sales to the government now account for 50% of the firm's business.

"Simulation has caught the fancy of people for no matter how expensive a simulation system, it is cheaper than" testing to destruction, Bosch observed.

SEL machines are used to simulate power plant operations, and space shuttle and aircraft flights, for example, he said.

The value of the average SEL unit is more than $120,000, he said. SEL provides its OEMs with systems level capabilities such as CPU, memory, disk, tapes and peripheral controllers.

Software includes Fortran IV, a real-time monitor, program development executive and terminal support subsystem, he explained.

The firm plans to offer some capabilities for multiuser functions, but is not chasing the general business DP market, he added.

Demand for 32-Bit Machines

One reason for the rise in demand for 32-bit minis is the decreasing difference in price between them and 16-bit machines, he indicated. The cost differential once was 50% to 100% more but is now between 10% and 20%. None of the major vendors got into the 32-bit field as they were booming with 16 bits, he added.

Commenting on Digital Equipment Corp.'s entry into the field, he said, "I'm not really tickled pink. In the long term we'll be competing with them, but for a couple of years they'll protect their 16-bit base and also will be selling to their current base."

SEL has the fastest I/O bus on the market — 26M byte/sec vs. DEC's 13M byte/sec, he added.

The firm has increased its production rate from four CPUs per week to eight and plans to be turning out 10 per week by June, he said.

Whereas a year and a half ago the firm had about 500 employees, it now has over 900, he said. SEL runs a second shift and next year will obtain 40,000 sq ft of office space so it can increase its production area. Currently the firm has around 150,000 sq ft.

In addition, the firm is "investigating the addition of a facility in Puerto Rico."

SEL has offices in 18 cities in the U.S. and 12 international sites through subsidiaries.

At the firm's annual meeting, President Asa Randolph unveiled the $40 millon projection but observed that as of the end of October, the firm's backlog was $34.5 million of which $32 million worth — 132 computers — must be shipped by June.

SEL was quoting delivery times of 150 to 180 days and is attempting to reduce that to 90-120 days.

The first-quarter earnings rose 461% to $875,000 from $156,000 in the same period the previous year on a 63% rise in revenues to $9.8 million from $6 million.

Randolph said the firm is converting from wire wrap technology to etched printed circuits throughout the 32 series line, which should expedite production and improve reliability.

The last big year SEL posted was fiscal 1970, when it showed $1.8 million in earnings on $20 million in revenues.

Canadian Firm Acquires Sycor, 12% of Data 100

MONTREAL — Northern Telecom Ltd. here went on a buying spree south of the border, agreeing recently to purchase Sycor, Inc. and pick up a 12% interest in Data 100 Corp.

Northern, with revenues of $1.1 billion (Canadian) in 1976, is the largest manufacturer of communications equipment in Canada and second only to Bell in North America.

Under the deal with Sycor, the firm would pick up all the Sycor stock at a rate of .9 share of Northern for each Sycor share with a minimum value of $22 per Sycor share. The agreement must be approved by Sycor shareholders and the boards of each firm.

The 12% purchase of Data 100 stock is part of an agreement between the two firms that will permit Northern to eventually purchase up to 35% of Data 100. The price for the one million shares of Data 100 stock was set at $15 per share; Northern has the option to pick up another one million shares by the end of 1978.

In addition, Northern will invest $5 million in a joint research and development effort with Data 100, the firms said.

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Aggressive Program Planned

Varian Gives Univac New Market

By Esther Surden
CW Staff

IRVINE, Calif. — When Univac acquired Varian Data Machines last spring, it continued the trend of mainframers moving into the lucrative minicomputer business.

Joining IBM and Honeywell, which now manufacture their own mini systems, Univac acquired the company to "attack a market it was not in before." This market consists of users who need systems that fall beneath the firm's BC/7 small business system and its somewhat larger 90 series, according to Jerome J. Meyer, vice-president and general manager of Univac Minicomputer operations.

The move to minis has given the firm the ability "to capture those buyers who normally buy products out of that sector," he explained, as well as the opportunity to protect the low end of the Univac line from erosion by other vendors.

Is Univac going to stay in the mini business? "Our strategy is not to buy out our competition," Meyer answered.

Although the division is still in a state of transition, ambitious plans to beef up operations are already under way. Estimating the minicomputer industry's growth rate at 40% per year, Meyer said "we have to beat that growth."

Univac will continue to serve the two market areas already developed by the Varian organization. As Meyer explained, the Varian systems were used by scientific users in high technology industries or incorporated into specialized systems such as numerical control units. Just prior to the Univac takeover, the firm had taken a step into the commercial end-user marketplace.

"We are trying to get a balance" between the scientific and commercial marketplace, he said.

Announcements Planned

Univac plans an aggressive program in product announcements over the next year. New products will be coming out at a fairly frequent rate, Meyer said.

Hinting that at least some of these announcements will be products designed to work with larger Univac systems in distributed data processing applications, Meyer added the firm also "has a lot of people looking at the embedded mini" that is, using the systems as componenets.

Univac, having acquired a mini manufacturer, "intends to exploit it to the maximum."

"When Univac took over Varian, "we kept it intact except for two areas," Meyer continued. The small Varian operation in Europe was moved to Univac International, and the customer engineers were moved into the larger Univac customer engineering group.

Cross-Training Underway

All customer engineers are in the process of being cross-trained on all the equipment, he said. Before, "there were cities where Varian just couldn't make a sale" because service was so far away, he stated.

Presently the hottest selling item in the Univac product line is its V600 system, "but that may be because that's what we are asking our people to sell," Meyer noted.

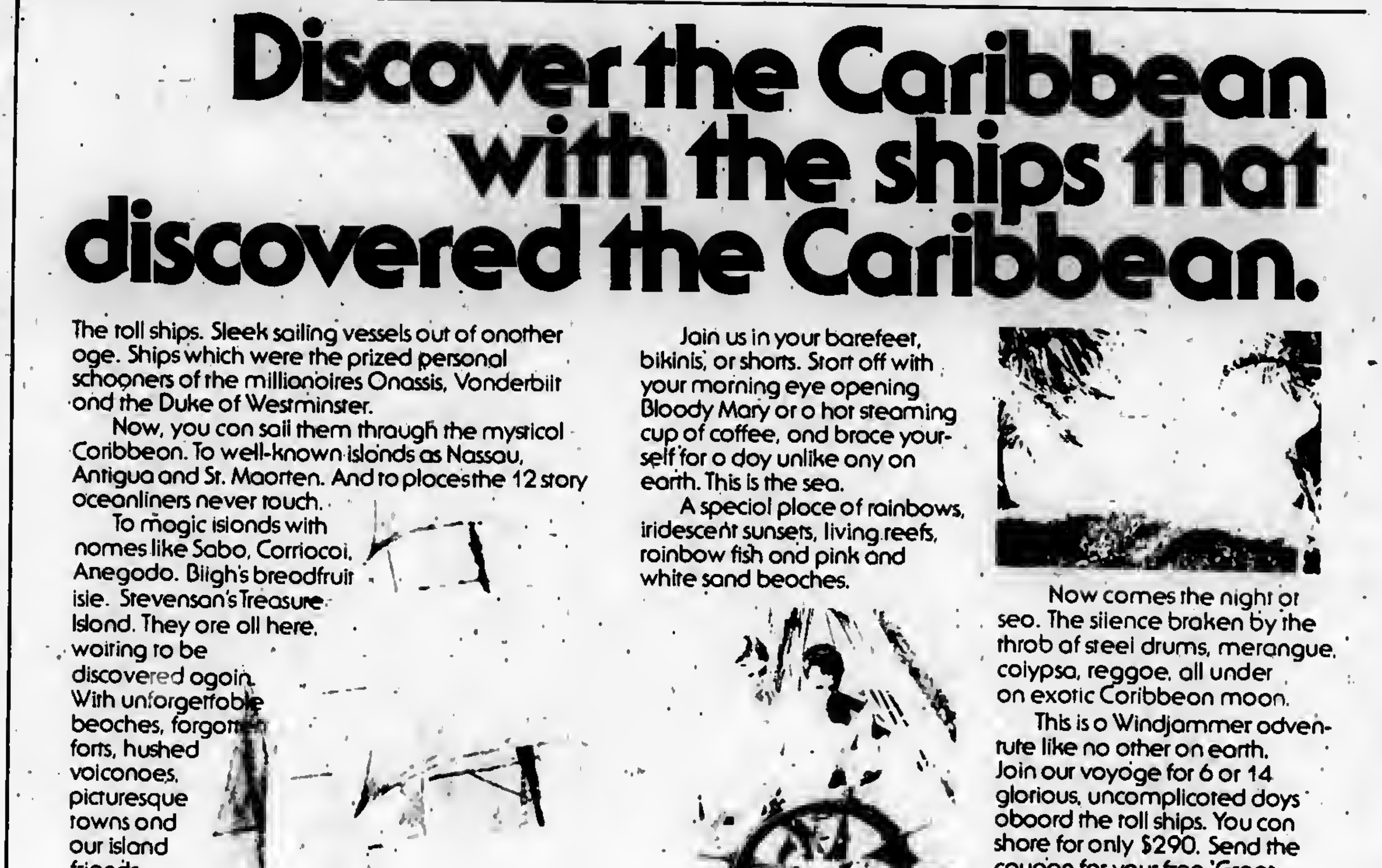
Minis for Lease?

Although there is a dedicated sales force for the minicomputer product line, the system is also available through the regular Univac catalog. The Minicomputer Operations Division is also eyeing the possibility of leasing the minicomputer equipment.

Part of the reason no such plan has been released is that the firm expects an upsurge in business when the minis are available on lease, he indicated. This might tax the company's present capacity, he noted, since it has not achieved the industry-standard 90-day delivery rate for its systems. It is working on the problem, he said.

CW Photo by E. Surden

Jerome J. Meyer



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•SYSTEMS PROGRAMMER •APPLICATION PROGRAMMER/ANALYSTS

Our data processing organization offers a professional environment and is flexible to the individual talents of its staff. If you are seeking an opportunity where your total experience can be utilized in a state-of-the-art shop ... read on!

CURRENT ENVIRONMENT:

Presently our dual operating consists of IBM 370/158 2 MEG; 370/145 1 MEG with the new IBM 3032 on order under OS. Peripherals include 3420's, 3330's, 3350's, 3211 and 1403. Our operating system is VS-1 with a large nationwide telecommunications on-line network.

SYSTEMS PROGRAMMER:

This outstanding opportunity is perfect for a progressive individual who wishes to exercise full range of systems programming skills. No chance to get weighed down in only one area of responsibility. We are small enough for an individual to be thoroughly challenged and recognized yet large enough to provide opportunities for advancement.

To qualify you must possess experience in the following areas: assembly language coding, SYSGEN-VS-1 or SVS, VS-1 or SVS internal, and JCL. Additional experience in interactive, time-sharing, performance measurement and evaluation, and hardware and software evaluation is a definite plus.

APPLICATION PROGRAMMER/ANALYSTS

We have immediate needs for individuals who enjoy to participate on projects from the ground floor up, analyze the needs of the user, investigate options, and complete the program. Qualifications include a strong COBOL background (1-3 years) in a manufacturing environment under OS/VS-1. JCL knowledge essential. Formal education in data processing plus assembly language coding desirable but not necessary.

Signode is a leader in the industrial packaging field and one of Fortune's 500. Our sales volume well exceeds $400 million. Our data processing organization will be relocating to a brand new building in Glenview, Illinois within 12-18 months. All these positions offer an outstanding salary and excellent opportunities for advancement based on performance. Company benefits include: company paid insurance for the family (Blue Cross/Blue Shield and dental care), profit sharing, 100% tuition reimbursement, and cost of living increases. Qualified applicants should call (312) 276-8500 ext. 524 or send your resume including salary history, in confidence to:

PAUL DUSKI
SIGNODE
CORPORATION
2600 N. Western Ave. Chicago, Ill. 60647

We are an equal opportunity employer and encourage females and minorities to apply

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ADMINISTRATIVE ASSOCIATE

Management Information Specialist
$15,000-$22,000

1) To analyze the management operations and to identify and implement mechanisms to aid decision-making. 2) To provide general administration support. This responsibility entails an increasing degree of working contactwith administrators in resource management and budget preparation and administration.

M.B.A. with emphasis on use of computers as management tools, another master's degree with emphasis on administration, or a bachelor's degree and a minimum of three years experience in an administrative capacity. Highly developed interpersonal skills enabling work with individuals and groups in problem solving are necessary.

Resume's must be in by January, 1978
Charles W. Tandy
Office of the Dean of Medicine
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CIG

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PROJECT LEADERS

- 5 + years experience including project management/design responsibilities
- COBOL
- CICS
- DL/I or other DBMS is a plus

PROGRAMMER/ANALYSTS

- 2 + years experience in program design and coding using ANS COBOL, CICS is a plus
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SYSTEMS PROGRAMMER

- DOS/VS
- POWER/VS
- CICS
- DL/I
- VS AM
- Assume total responsibility for System Software and Software package installation, maintenance and tuning.

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- *Accounts Receivable*
- *General Ledger*
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- *Sales Analysis*

Current hardware is a 2M IBM 148 with an on order 3031.

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Equal Opportunity Employer

PROGRAMMER

Las Vegas, Nevada

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Leading manufacturer, involved in the high technology electronics field, seeks a responsible, agressive, professional to join in the development of manufacturing systems. Rapid growth requires staff expansion and offers challenging and rewarding opportunity for the successful applicant.

Qualifications should include three years Cobol programming experience, working knowledge of IBM 370 and DOS/VS, JCL, RPG II and experience in the development of manufacturing systems using DBOMP for such things as inventory control, work in process, labor costing and MRP. Knowledge of CICS is desirable.

Starting salary commensurate with experience, education and ability. Excellent benefit package. Contact in confidence E.M. Sisson, Amperex Electronic Corporation, Slatersville, R.I. 02876, (401) 762-9000, An Equal Opportunity Employer.

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(609) 667-4488

RSVP SERVICES, Dept. C
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1777 Walton Road
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(215) 629-0595

RSVP SERVICES
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DEC PROGRAMMER/ANALYST

Dynamic, upstate New York marketing organization is looking for a Programmer/Analyst with at least two years experience with DEC RSTS Basic-Plus System; preferably on 11/70. Commercial background desired in order processing, inventory control, and accounting applications. Ability to deal with user groups is essential.

We can offer you a friendly working environment, good starting salary, excellent benefits and profit sharing. Send resume and salary history in confidence to CW Box 1366, 797 Washington St., Newton, MA. 02160.

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- Programmers
- Programmer/Analysts
- Systems Anlaysts

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(713) 961-5500
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- IBM 9020 or 360 COMPUTER SYSTEMS
- STRUCTURED PROGRAMMING
- REAL TIME SYSTEMS
- ASSEMBLY LANGUAGES
- JOVIAL OR OTHER HIGH ORDER LANGUAGES

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Design, debug and maintain various microprocessor systems in an engineering support environment. Qualify users requirements for microprocessor hardware/software support. Evaluate microprocessors as candidates for support systems and implement standardized debugging facilities for selected microprocessors.

Must have experience with language related software: computers, assemblers, linkers. Requires BSCS or BSEE or two years' experience.

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ANALYST PROGRAMMERS

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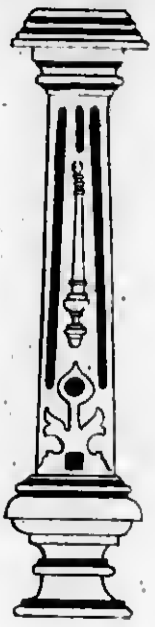

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To $22,000 Range

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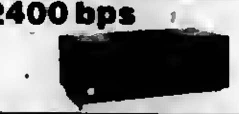
2400 bps 	**MODEM 3300/24** 2/4 wire dedicated line operation with built-in test pattern generator.	$995 $35/mo.*	**$595** **$24/mo.***
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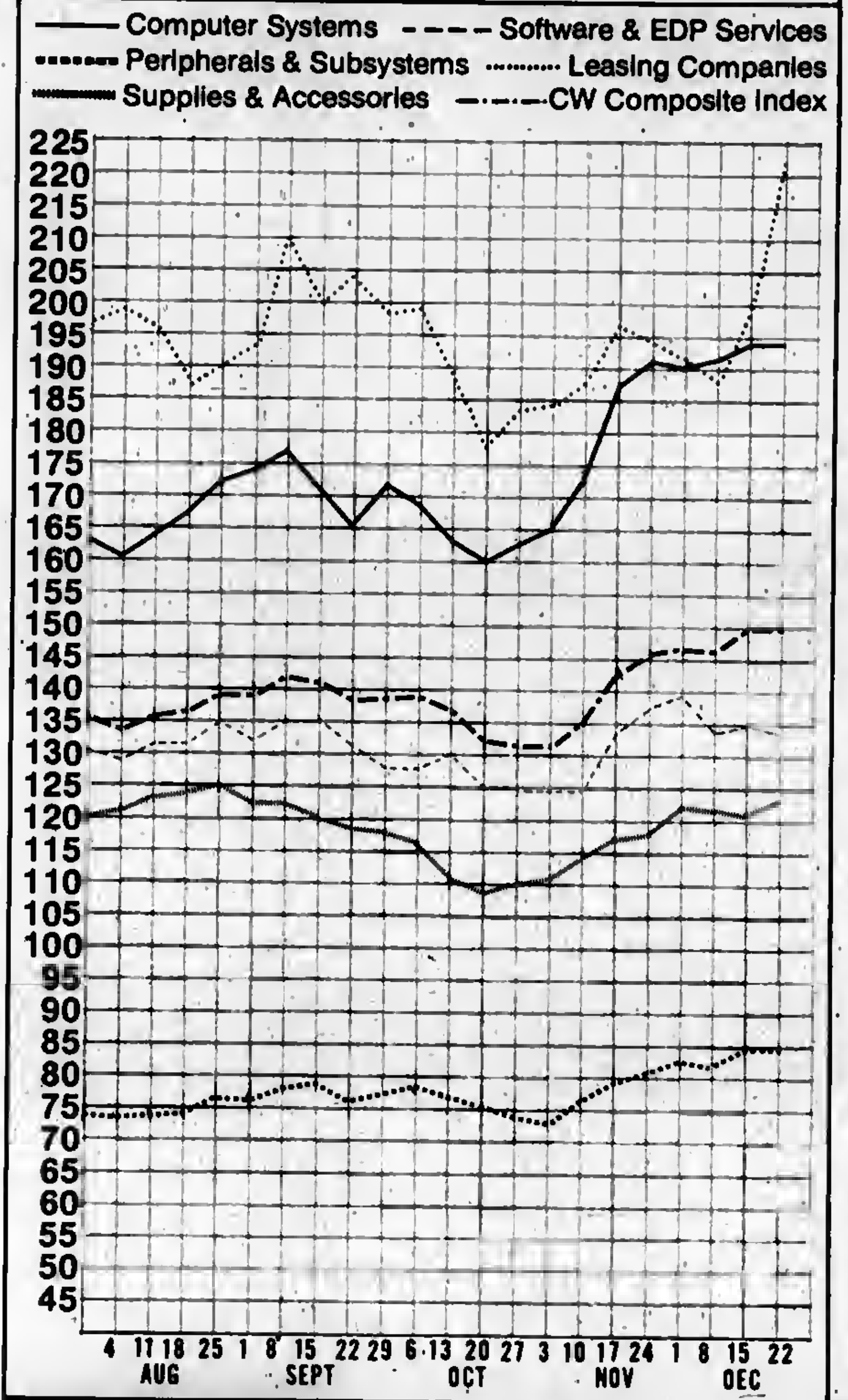

Earnings Reports

COMPUTER COMMUNICATIONS
Three Monthe Ended Sept. 30

	1977	1975
Shr Ernd	$.14	$.13
Revenue	3,506,431	3,068,254
Tax Cred	200,000	180,000
Earnings	414,254	372,575

COMPUTER CONSOLES
Nine Months Ended Sept. 30

	1977	1976
Shr Ernd	$.30	a.....
Revenue	11,972,830	$6,478,584
Spec Cred	91,500	.....
Eemings	544,672	19,326

a-No shere eernings are shown es preferred dividend requirements exceeded net Income.

COMPUTER INSTRUMENTS
Nine Months Ended Oct. 7

	1977	a1978
bRevenue	$1,059,741	$726,716
Olsc Op Loss	.....	305,794
Loss	127,678	464,030

a-Resteted to reflect discontinued operetions.
b-From continuing operations.

DATA SYSTEMS ANALYSTS
Nine Months Ended Sept. 30

	1977	1976
Shr Ernd	$.48	$.25
Revenue	3,469,521	2,614,790
Esrnings	316,059	196,612

OIOI-LOG SYSTEMS
Yeer Ended Sept. 30

	1977	1878
Shr Ernd	$.92	$.51
Revenue	4,054,894	2,503,951
Esrnings	634,100	344,032

GREYHOUNO COMPUTER
Three Months Ended Sept. 30

	1977	1976
Revenue	$11,660,000	$11,560,000
Olsc Op Loss	.....	1,530,000
eEernings	1,236,000	(769,000)
9 Mo Rev	33,514,000	34,591,000
Disc Op Loss	2,656,000	1,777,000
Eernings	736,000	106,000

a-Earninge per share ere not reported beceuse ell of the compeny's outstanding common stock is owned by Greyhound Corp.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PPICES WEONESOAY, DECEMBER 21, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTEP SYSTEMS

EXCH		1977 RANGE (1)	CLOSE CEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMCAFL CCRP	22- 51	49 1/4	-1 1/8	-2.2
N	BUPPCUGHS CORP	55- 91	69	- 1/4	-0.3
O	CCMPUTEF AUTCMATICN	18- 30	25 3/4	-1 1/4	-4.6
N	CCNTRCL CATA CORP	20- 27	26 5/8	- 3/8	-1.3
C	CRAY PESEARCH INC	15- 30	28 3/4	+ 1/4	+0.8
N	DATA GENEPAL CCRP	35- 54	47 5/8	-1	-2.0
N	OATAPGINT CCRP	18- 41	39 1/4	+ 1/8	+0.3
N	OIGITAL ECUIPMENT	37- 53	45 1/2	+ 5/8	+1.3
N	ELECTRGNIC ASSOC.	2- 3	2 3/8	- 1/4	-9.5
A	ELECTRCNIC ENGINEER.	8- 13	11 3/4	-1 1/8	-8.7
O	FCUR-PHASE SYSTEMS	13- 21	20 1/4	- 1/8	-0.6
N	FCXBCRO	41- 54	47 7/8	- 1/2	-1.0
O	GENERAL AUTCMATICN	6- 9	7 1/4	+ 3/4	+11.5
O	GRI COMPLTEP CORP	1- 1	3/4	+ 1/4	+50.0
N	HEWLETT-PACKARC CO	69- 87	72	+ 1/4	+0.3
N	HCNEYWELL INC	43- 55	45 1/4	0	0.0
N	IBM	245-286	266	- 1/4	0.0
C	MANAGEMENT ASSIST	5- 10	9 1/4	- 3/4	-7.5
O	MICRCDATA CCPP	7- 18	11	- 1/4	-2.2
C	MCCULAR CCMPUTEP SYS	5- 9	8 5/8	- 1/8	-1.4
N	NCP	32- 47	39	- 1/2	-1.2
C	PPIME CCMPUTER INC	12- 23	22 1/4	- 3/4	-3.2
N	PEFKIN-ELMEP	17- 22	19 3/4	- 3/8	-1.8
N	RAYTHEON.CO	16- 35	32 3/8	-1	-2.9
N	SPFRPY RANC	30- 42	34 3/4	0	0.0
G	SYCCR INC	8- 20	19 3/8	- 5/8	-3.1
A	SYSTEMS ENG. LABS	5- 11	10 7/8	- 3/8	-3.3
A	WANG LABS.	10- 14	12 1/4	- 1/2	-3.9

LEASING CGMPANIES

EXCH		1977 RANGE (1)	CLOSE CEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 5	4 1/2	0	0.0
C	BCCTHE CCUPIEP CORP	8- 13	13 1/2	-2	-12.9
C	CCMOISCC INC	10- 15	14 1/2	0	0.0
A	CCMMERCE GRCUP CCRP	1- 3	3/4	0	0.0
A	CCMPLTEP INVSTPS CRP	1- 2	3/4	0	0.0
M	CATPCNIC PENTAL	0- 2	1 1/8	0	0.0
A	CCL INC	1- 3	2 3/4	+ 1/8	+4.7
N	GPF INC	6- 10	8 3/4	+ 1/8	+1.4
N	ITEL	13- 22	19 1/2	- 3/8	-1.8
N	LEASCC CCRP	15- 27	24	+ 1/4	+1.0
O	LEASPAC CORP	1- 2	1 1/2	+ 5/8	+71.4
C	NPG INC	1- 1	1/4	+ 1/8	+100.0
A	PICNEEP TEX CORP	5- 11	5 5/8	+ 1/8	+2.2
N	U.S. LEASING	10- 16	13 3/4	- 1/8	-0.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BIO PRICES AS OF 3 P.M. OR LAST BID
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SCFTWARE & ECP SERVICES

EXCH		1977 PANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ACVANCEC COMP TECH	0- 2	7/8	0	0.0
O	ANACCMP INC	7- 10	8 7/8	- 1/8	-1.3
A	APPLIEO CATA PES.	5- 10	8 5/8	- 1/8	-1.4
N	AUTGMATIC CATA PROC	23- 30	28 3/4	- 3/8	-1.2
O	CCLEMAN AMERICAN COS	2- 2	1 3/4	+ 1/8	+7.6
O	COMPL-SERV NETWORK.	9- 15	11 3/4	+ 1/2	+4.4
O	CCMP ELECTIGN SYSTMS	6- 10	9 1/4	+ 1/4	+2.7
O	CCMPUTER HCRIZCNS	1- 1	1	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/8	- 1/8	-1.2
N	COMPUTEP SCIENCES	7- 10	9 5/8	+ 1/3	+1.3
G	CCMPUTEP TASK GRCUP	1- 2	1 5/6	0	0.0
O	CGMPUTER USAGE	1- 3	1 1/2	0	0.0
C	CCMSHAPE	5- 8	7 1/4	- 1/4	-3.3
G	OATA CIMENSIGNS INC	3- 5	4 1/8	+ 3/8	+10.0
C	CATATAB	1- 2	1 1/2	0	0.0
N	ELECTRCNIC CATA SYS.	14- 20	15 1/2	+ 1/2	+3.3
O	INSYTE CORP	2- 3	1 1/8	C	0.0
G	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	- 3/8	-9.6
G	KEYOAIA COPP	1- 3	1 3/8	0	0.0
A	LCGICON	7- 17	12 5/8	-1 1/P	-3.1
A	MANAGEMENT CATA	1- 2	1	- 1/8	-11.1
A	NATICNAL CSS INC	10- 16	15 1/2	+ 5/8	+4.2
O	NATICNAL OATA CORP	4- 7	7	+ 1/8	+1.8
A	CN LINE SYSTEMS INC	16- 22	19 3/8	- 3/8	-1.8
N	PLANNING PESEAPCH	3- 6	4 5/8	+ 1/8	+2.7
O	PPCGRAMMING & SYS	1- 1	1/4	- 1/8	-33.3
O	RAPIOATA INC	2- 3	2 3/4	0	0.0
O	REYNCLOS & REYNGLD	17- 21	20 1/4	+ 1/4	+1.2
O	SCIENTIFIC COMPUTERS	1- 4	4	0	0.0
O	TYMSHAPE INC	14- 23	21 5/8	-1 3/8	-5.9
A	URS SYSTEMS	4- 5	4 3/8	- 1/8	-2.7
N	WYLY CCRP	1- 2	3/4	-	-7.7

PEPIPHERALS & SUBSYSTEMS

EXCH		1977 PANGE (1)	CLOSE DEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ACCRESSOGRAPH-MULT	10- 16	14 1/8	- 1/4	-1.7
O	AOVANCED MEMORY SYS	7- 9	8 1/9	- 1/8	-1.5
N	AMFEX CCRP	8- 11	9 7/8	+ 1/2	+5.3
O	ANCERSON JACOBSON	3- 5	4 3/4	0	0.0
N	APPLIEO CIG OATA SYS	10- 20	13 7/8	+ 1/2	+3.7
G	BEEHIVE INT'L	5- 12	4 7/8	- 5/8	-11.3
A	BCLT,BERANEK & NEW	7- 9	7 3/8	+ 3/8	+5.3
N	BUNKER-RAMO	8- 13	11 1/8	- 1/8	-1.1
A	CALCCMP	3- 5	2 7/8	0	0.0
O	CAMBRIOCE MEMORIES	1- 4	3 5/8	+ 1/4	+7.4
N	CENTRONICS CATA COMP	19- 30	19	- 1/4	-1.2
G	CCGNITPONICS	1- 1	7/8	+	+7.1
O	COMPLIEP CCMMUN.	5- 8	7 3/8	+ 3/8	+5.3
O	CCMPUTER CCNSOLES	6- 7	4 1/4	0	0.0
A	CCMPUTER EQUIPMENT	2- 4	3 1/2	+ 1/2	+16.6
O	CCMPUTER TPANSCEIVER	1- 1	1 1/2	0	0.0
C	CCMTEN	9- 13	10 1/2	- 3/8	-3.4
N	CCNRAC CCRP	19- 28	23 1/8	- 5/8	-2.6
O	CATA ACCESS SYSTEMS	4- 5	3 1/4	+ 1/4	+8.3
O	OATA 100	6- 11	10	- 1/8	-1.2
A	CATA PROOUCTS COPP	9- 19	16 5/8	- 3/8	-2.2
G	CATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	OATUM INC	1- 2	2	+ 1/8	+6.6
O	OECISION OATA COMPUT	2- 3	1 3/4	- 1/8	-6.6
O	OELTA CATA SYSTEMS	1- 1	1/2	+ 1/8	+33.3
A	OCCUMATICN INC	6- 11	9 7/8	- 1/4	-2.4
O	OATAPAM COPP	2- 24	22	-1	-4.3
N	ELECTRONIC M & M	4- 5	4 1/2	+ 1/4	+5.8
O	FABRI-TEK	1- 2	1	0	0.0
O	GENEPAL CCMPUTER SYS	0- 2	1 5/8	0	0.0
N	HAZELTINE CCRP	8- 12	10 3/8	- 1/8	-1.1
N	HAPPIS CORP	28- 45	44 1/4	-1	-2.2
A	INCCTERM CORP	10- 19	18	0	0.0
O	INFCREX INC	4- 7	6 1/4	- 3/8	-5.6
O	INFORMATICN INTL INC	9- 14	9	0	0.0
O	INTEL CORP	38- 57	45	0	0.0
A	LUNOY ELECTRONICS	3- 6	3 1/2	- 1/8	-3.4
O	MSI CATA COPP	6- 15	14 1/8	- 1/8	-0.8
O	MEMOREX	23- 34	30	-1 7/8	-5.8
N	MGHAWK CAIA SCI	5- 8	6 1/8	0	0.0
O	PENRIL CCRP	2- 5	5 3/4	0	0.0
N	PERTEC CCPP	7- 11	10 7/8	- 1/8	-1.1
A	PCTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISICN INST.	2- 2	2	0	0.0
O	QUANTOR COPP	3- 5	3	- 1/4	-7.6
O	RECCGNITICN EQUIP	6- 10	7 3/8	+ 1/4	+3.5
O	SCAN CATA	1- 2	7/8	- 1/8	-12.5
O	STCRAGE TECHNOLOGY	10- 21	20 3/8	- 3/8	-1.8
O	T BAR INC	7- 13	12 5/8	+ 1/8	+1.0
O	TALLY CORP.	4- 6	4 1/8	+ 1/8	+3.1
A	TEC INC	7- 10	7 1/4	- 1/8	-1.6
N	TEKTRCNIX INC	29- 40	36 5/8	-1 1/4	-3.3
N	TELEX	2- 3	3	0	0.0
O	WILTEK INC	1- 1	3/4	- 3/8	-33.3

SUPPLIES & ACCESSORIES

EXCH		1977 PANGE (1)	CLOSE CEC 21 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PROOS	6- 8	7 1/4	+ 1/2	+7.4
O	BALTIMCRE BUS FORMS	1- 4	1 7/8	+ 1/8	+7.1
A	BARRY WRIGHT	10- 17	15 7/8	+ 3/4	+4.9
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	OUPLEX PROOUCTS INC	14- 20	18 1/2	-1 1/4	-6.3
N	ENNIS BUS. FORMS	6- 7	7	+ 5/8	+9.8
G	GRAPHIC CGNTPCLS	13- 18	17	+ 1/2	+3.0
N	3M CCMPANY	45- 56	45 7/8	- 1/2	-1.0
O	MCCRE COPP LTC	24- 37	27 1/4	+ 1/2	+1.8
N	NASHUA CORP	16- 28	19	- 1/8	-0.6
[illegible]	STANCARC REGISTER	18- 25	22	+ 1/4	+1.[illegible]
O	TAB PRODUCTS CC	9- 19	9	- 3/4	-7.6
N	UARCC	18- 22	20	- 1/2	-2.4
A	WABASH MAGNETICS	10- 15	12	- 1/4	-2.0
N	WALLACE BUS FORMS	17- 21	20 1/8	0	0.0

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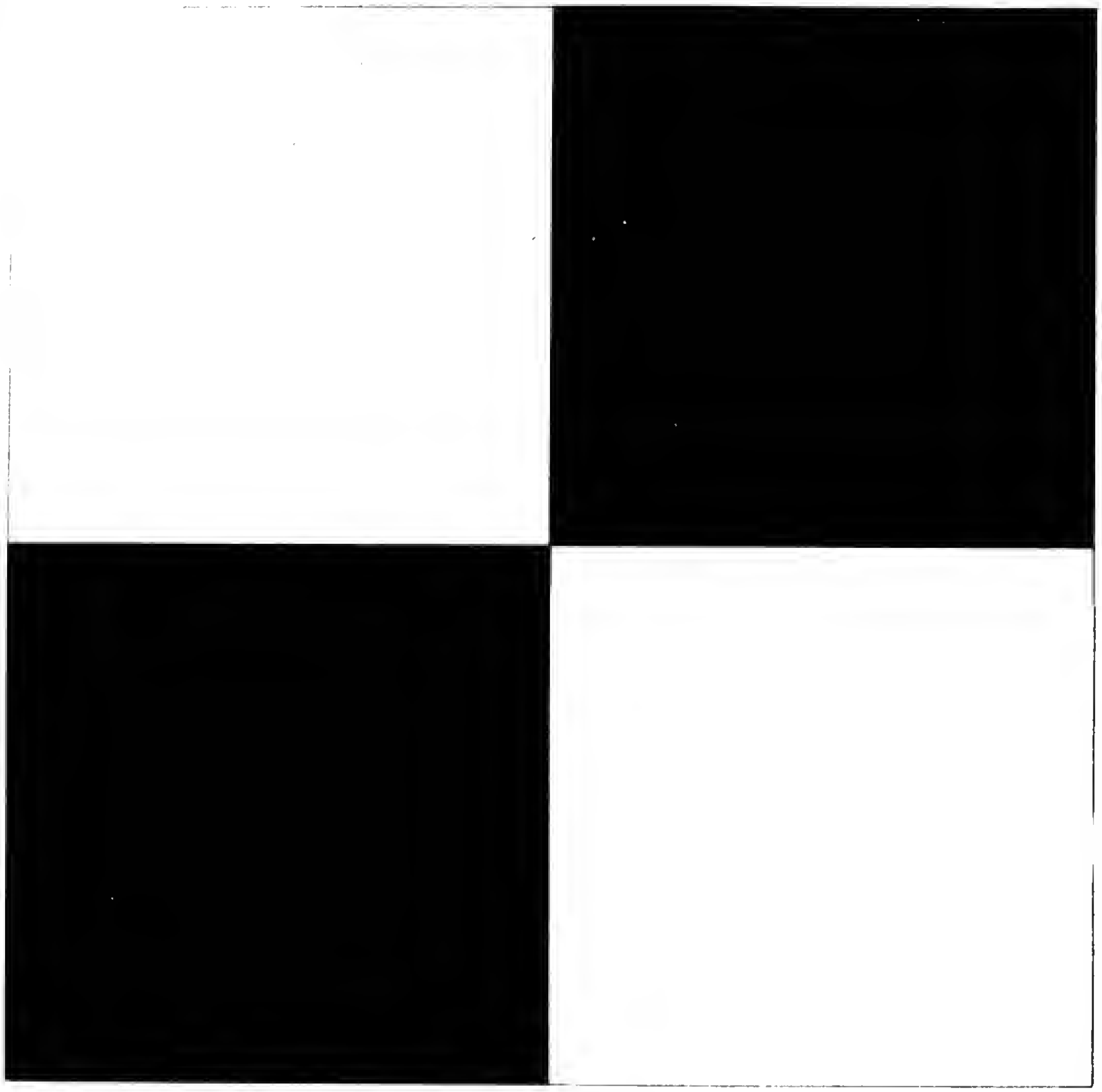
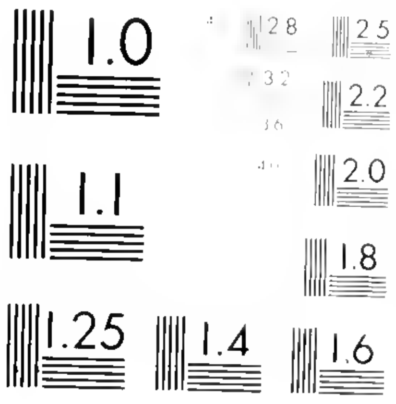


RESOLUTION CHART



MICROCOPY RESOLUTION TEST CHART

100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and 100 ÷ 20 = 5.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and 7.9 × 5 = 39.5 lines per millimeter recorded satisfactorily. 10.0 × 5 = 50 lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.

THE END